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THE BOSTON Medical and Surgical JOURNAL

OFFICIAL ORGAN OF THE MASSACHUSETTS MEDICAL SOCIETY AND OF THE NEW ENGLAND SURGICAL SOCIETY

VOL. CLXXVII
No. 2

THURSDAY, JULY 12, 1917

Single Copies 15 Cents
Five Dollars per Annum

CONTENTS

ORIGINAL ARTICLES

AN ANALYSIS OF 133 FRACTURES OF THE SPINE TREATED AT THE MASSACHUSETTS GENERAL HOSPITAL. *By John B. Hartwell, M.D.*, Boston.

THE CLASSIFICATION OF HAY-FEVER POLLENS FROM A BIOLOGICAL STANDPOINT. *By William Scheppegrell, M.D.*, New Orleans.

SOME NOTES ON ARTIFICIAL PNEUMOTHORAX. *By Paul H. Ringer, M.D.*, Asheville, N. C.

CLINICAL DEPARTMENT

A CASE OF PERNICIOUS ANEMIA IN A SYPHILITIC TREATED WITH SALVARSAN. *By Lawson G. Lowrey, M.D.*, Boston.

EDITORIALS

VOLUNTEERS FOR THE MEDICAL CORPS.
AMERICAN OCCUPATION OF BRITISH FIELD HOSPITALS.
WELCOME TO AMERICAN DOCTORS.

For complete table of contents, see first text page.

JUNE NUMBER

Surgical Clinics of Chicago

Clinic of Dr. A. D. Bevan, *Presbyterian Hospital*
Pulsion Diverticulum of Esophagus—8 illustrations.
Removal of Murphy Button from Stomach Two and One-half Years after Gastro-enterostomy—5 illustrations.
Carcinoma of Jejunum—4 illustrations.
Hernia of Diaphragm—2 illustrations.

Clinic of Dr. A. J. Ochsner, *Augustana Hospital*
Vaginal Hysterectomy for Carcinoma—6 illustrations.

Clinic of Dr. A. E. Halstead, *St. Luke's Hospital*
Internal Hydrocephalus—3 illustrations.
Pyloric Obstruction following Sulphuric Acid Poisoning—2 illustrations.

Clinic of Dr. L. L. McArthur, *Michael Reese Hospital*
Thrombo-angiitis Obliterans of Buerger.

Clinic of Dr. E. Wyllys Andrews, *Mercy Hospital*
Varicocele—3 illustrations.

Clinic of Dr. Carl Beck, *North Chicago Hospital*
Treatment of Obstinate Sciatica—1 illustration.

Clinic of Dr. D. N. Eisendrath, *Cook County Hospital*
Gunshot Wounds of Skull—9 illustrations.

Clinic of Dr. J. L. Porter, *St. Luke's Hospital*
Calcaneocavus—5 illustrations.

Clinic of Dr. V. C. David, *Presbyterian Hospital*
Local Anesthesia for Hemorrhoidectomy—10 illustrations.

Clinic of Dr. D. B. Phemister, *Presbyterian Hospital*
Reconstruction of Hepatic Duct—4 illustrations.

Clinic of Dr. Carl B. Davis, *Presbyterian Hospital*
Pancreatic Abscess.

Clinic of Dr. N. M. Percy, *Augustana Hospital*
Resection for Gastric Carcinoma—17 illustrations.

Clinic of Dr. James T. Case,
(Battle Creek Sanitarium) St. Luke's Hospital
Operation *vs.* Radiotherapeutics in Uterine Myomas.

Clinic of Dr. Thomas J. Watkins, *St. Luke's Hospital*
Perineorrhaphy—5 illustrations.

Clinic of Dr. Carey Culbertson, *Presbyterian Hospital*
Therapeutic Abortion and Sterilization—4 illustrations.

Clinic of Dr. A. H. Curtis, *St. Luke's Hospital*
Salpingitis.

Clinic of Dr. M. Sproat Heanly, *Presbyterian Hospital*
V-shaped Hysterectomy for Dysmenorrhea and Leukorrhea—7 illustrations.

Clinic of Dr. Charles A. Parker, *Cook County Hospital*
Treatment of Burns, with Special Reference to Prevention of Deformities—9 illustrations.

Clinic of Dr. Kellogg Speed, *Cook County Hospital*
Mediastinal Tumor probably of Thymus Origin—2 illus.

Clinic of Dr. G. G. Davis, *Presbyterian Hospital*
Cure of Hallux Valgus—9 illustrations.

Clinic of Dr. F. A. Besley, *Cook County Hospital*
Regional Surgery—6 illustrations.

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TABLE OF CONTENTS

July 12, 1917

ORIGINAL ARTICLES

AN ANALYSIS OF 133 FRACTURES OF THE SPINE TREATED AT THE MASSACHUSETTS GENERAL HOSPITAL. *By John B. Hartwell, M.D.*, Boston. 31

THE CLASSIFICATION OF HAY-FEVER POLLENS FROM A BIOLOGICAL STANDPOINT. *By William Scheppegrell, A.M., M.D.*, New Orleans. 42

SOME NOTES ON ARTIFICIAL PNEUMOTHORAX. *By Paul H. Ringer, A.B., M.D.*, Asheville, N. C. 50

CLINICAL DEPARTMENT

A CASE OF PERNICIOUS ANEMIA IN A SYPHILITIC TREATED WITH SALVARSAN. *By Lawson G. Lowrey, A.M., M.D.*, Boston. 52

BOOK REVIEWS

Diseases of Children. By George M. Tuttle, M.D., and Phelps G. Hurford, M.D. 53

EDITORIALS

VOLUNTEERS FOR THE MEDICAL CORPS 54
AMERICAN OCCUPATION OF BRITISH FIELD HOSPITALS 55
WELCOME TO AMERICAN DOCTORS 55
A CANCER DECALOGUE 55
MEDICAL NOTES 55

THE MASSACHUSETTS MEDICAL SOCIETY

NOTES FROM THE DISTRICT SOCIETIES 60

OBITUARIES

COLONEL GEORGE D. DESHON 60
HERBERT MAXON KING, M.D. 61
JOHN WILLIAM WATSON, M.D. 61

CORRESPONDENCE

A REMINISCENCE OF DR. HOLMES. *Robert T. Edes* 64

MISCELLANY

TUBERCULOSIS AND ITS RELATION TO THE MOTHER'S AID LAW IN MASSACHUSETTS 61
CANCER DECALOGUE PREPARED BY THE STANDING COMMITTEE ON THE CONTROL OF CANCER OF THE MASSACHUSETTS MEDICAL SOCIETY 62
INFORMATION REGARDING APPOINTMENT IN THE MEDICAL RESERVE CORPS OF THE UNITED STATES ARMY 62
THE AMERICAN MEDICAL UNITS 63
NOTICES, APPOINTMENTS, RECENT DEATHS, ETC. 64

Original Articles.

AN ANALYSIS OF 133 FRACTURES OF THE SPINE TREATED AT THE MASSACHUSETTS GENERAL HOSPITAL.

BY JOHN B. HARTWELL, M.D., BOSTON.

THE data upon which this report is based were obtained from the records of 133 patients who were treated for fracture of the spine at the Massachusetts General Hospital between January 1, 1900, and December 31, 1914. To the members of the staff* of the hospital under whose care the patients came, I am indebted for the opportunity of making this analysis.

The report deals with 7 women and 126 men, the majority of them in the prime of life, who met with accidents which resulted in fracture of the vertebrae alone, or in combination with other injuries,

AGES BY DECADES	
10-19	7
20-29	37
30-39	40
40-49	26
Over 50	21
Age not noted	2
	133

* The patients were under the care of the following present and past members of the staff: Dr. F. G. Balch, Dr. H. H. A. Beach (deceased), Dr. G. W. W. Brewster, Dr. W. A. Brooks, Dr. A. T. Cabot (deceased), Dr. Hugh Cabot, Dr. Farrar Cobb, Dr. E. A. Codman, Dr. W. M. Conant, Dr. Lincoln Davis, Dr. J. W. Elliott, Dr. R. B. Greenough, Dr. F. B. Harrington (deceased), Dr. J. B. Hartwell, Dr. John Homans, Dr. D. F. Jones, Dr. S. J. Mixter, Dr. W. J. Mixter, Dr. J. G. Mumford (deceased), Dr. F. T. Murphy, Dr. C. A. Porter, Dr. C. B. Porter (deceased), Dr. C. L. Scudder, Dr. M. H. Richardson (deceased), Dr. J. C. Warren, Dr. Hugh Williams.

and directly or indirectly caused death in 59 instances.

The type of accident which produced the injuries is shown in the following table:

Falls from a height		83
Jack knifed by falling weight	11	
Jack knifed by low bridge	6	
Jack knifed by cave-in	1	
Jack knifed by diving	5	
Jack knifed by football	1	
Jack knifed by coasting	1	25
Collision with trains	8	
Collision with automobile	1	9
Direct blows		7
Alighting from moving cars		2
No history obtained		7
		133

A study of the histories of the accidents, as given by the patients, in this series allows no general conclusion to be drawn as to the mechanism of the fracture of the spine. There is no reasonable doubt that in the jack-knifing accidents the immediate cause of fracture was hyperflexion of the spine, and a similar factor may be assumed to have been the causative means in the 83 patients who fell from a height, but this cannot be proven from the accounts given by the injured themselves. Thus 22 stated that they landed on their head and shoulders, 4 on their shoulders, 10 flat on their back, 4 on their buttocks, and 4 on their feet, while 39 were unable to state how they landed; but of the 22 who landed on their head and shoulders, 8 stated that the fall rendered them unconscious for varying periods; 1 was walking in his sleep when the accident occurred, and 1 was so intoxicated

that the fact that he landed on his head was the only detail of the accident he could give. Similar discrepancies are found in the records of the remaining 22 patients who made positive statements as to the manner of landing.

The regions injured by the different types of accident are shown in the following table:

	Injured Region		
	Cervical	Dorsal	Lumbar
Falls from a height	31	30[1]	22
Jack knifed by falling weights	3[2]	5	3
Jack knifed by low bridge	3	2	1
Jack knifed by cave-in	0	1	0
Jack knifed by diving	4	1	0
Jack knifed by football accident	1	0	0
Jack knifed by coasting accident	0	1	0
Collision with trains	3	2	3
Collision with automobiles	0	0	1
Direct blows	0	5	2
Alighting from moving cars	0	1	1
No history obtained	4	3	0
	49	51	33

All told, this series contains:

Fracture in the cervical region	48
Fracture in the cervical and dorsal regions	1
Fracture in the dorsal region	50
Fracture in the dorsal and lumbar regions	1
Fracture in lumbar region	33
	133

Of 49 instances of fracture in the cervical region, there were broken singly or in combination:

1st vertebra	0	
2d vertebra	1	
3d vertebra	7	
4th vertebra	14	62
5th vertebra	29	
6th vertebra	19	
7th vertebra	6	
	76	

62 of 76 fractures in the cervical region, suffered by 49 patients, involved the fourth, fifth and sixth vertebrae alone or in combination.

51 patients suffered fractures of the dorsal spine as follows:

1st vertebra	1	
2d vertebra	3	16
3d vertebra	7	
4th vertebra	5	
5th vertebra	1	
6th vertebra	2	13
7th vertebra	4	
8th vertebra	6	
9th vertebra	3	
10th vertebra	9	37
11th vertebra	8	
12th vertebra	17	
	66	

If the dorsal spine be divided into thirds, there were fractures of the bones of the upper third in 16 instances, of the middle third in 13 instances, and of the lowest third in 37 instances, or more frequently than the other two segments combined.

34 patients presented fractures of the lumbar spine, as follows:

1st vertebra	20
2d vertebra	8
3d vertebra	1
4th vertebra	3
5th vertebra	4
Unspecified	4
	40

These tables confirm the accepted view that there are two regions of the spine especially likely to suffer fracture, the mid-cervical and the dorso-lumbar. In the former situation the fourth, fifth and sixth vertebrae are the vulnerable ones, and in the latter situation the tenth, eleventh and twelfth dorsal and first lumbar.

In this series, isolated fractures of the vertebral processes seem rare: only seven are recorded; five of transverse process, and one each of spinous process and articular process. As is to be expected, these process fractures all occurred in the lumbar region, where the transverse processes are long and slender, not short and thick, as in the cervical region, nor protected by fragile ribs, as in the dorsal region. The spinous processes in the lumbar region are, likewise, less protected than in either the cervical or dorsal segments of the spine, where the imbrication of the spinous processes allows any trauma to be borne by several, and not by an isolated process.

Process fractures in this series resulted from direct trauma, in contradistinction to the body fractures, a certain proportion of which are certainly, and the remainder presumably, dependent on indirect trauma.

In addition to compression fractures of the vertebral bodies and fractures of the vertebral processes, a review of the post-mortem records has shown three cases of fracture of the intervertebral discs, all in the cervical segment of the spine. For access to the necropsy records, the author is indebted to Dr. James Homer Wright, director of the clinico-pathological laboratory of the Massachusetts General Hospital.

In each of the cases the patients on entrance to the hospital had a complete motor and sensory paralysis below the segment of the cord opposite the fractured disc, with abolition of all reflexes, superficial and deep, and retention of urine and feces.

The autopsy protocols in these cases are given in full so far as they relate to the spine, since no text-books examined by the author make mention of isolated fracture of the intervertebral discs.

(1) "Viewed from in front, the third cervical disc is of slightly increased prominence. A V-shaped segment sawed from the front of the column shows discs between third and fourth cervical, and fourth and fifth cervical torn apart and blood-stained. Spinous process of the

[1] 12th dorsal and 1st lumbar injured.
[2] 7th cervical and 1st dorsal injured.

third cervical abnormally mobile and somewhat separated from that of the fourth cervical. Spinal cord opposite third and fourth cervical flattened and distinctly soft to touch."

(2) "Cervical spine from in front shows deformity at level of fourth and fifth segments, characterized by projection forward of the body of the fourth cervical from that of the fifth cervical. Dissection reveals rupture of the fourth disc and adjoining ligaments. From behind, the cervical segment of the spine at the level of the fourth cervical, fragmented. On laminectomy, cord at the level of fracture depressed and softened. Vertebral canal at level of the fourth intervertebral disc interrupted, the column discontinuous, evidently by rupture of the disc and by the ligaments of the spinous processes."

(3) "Laminae of fifth and sixth cervical vertebrae are separated from one another by an interval of about 1 cm., and through an opening just to the right of the spinous process, dura is apparent. No fracture of the laminae or spinous process is made out. On removing the cord the anterior surface of the spinal canal, at a point corresponding to the interval between the fifth and sixth cervical vertebrae, is bent backward to form an obtuse angle from the shoving forward of the cervical vertebrae above this point. On section through the cervical vertebrae, the disc between the fifth and sixth cervical is found disintegrated."

In 41 instances, or 30.8%, the spinal fracture was but one item of the injuries sustained by the patient, as recorded in the records. The nature of these complicating injuries is tabulated below:

	CERVICAL	DORSAL	LUMBAR	TOTAL
Fractured skull	6	4	2	12
Fractured ribs	5	8	3	16
(Punctured lung	1	3	0	4)
Fractured sternum	0	1	2	3
Fractured upper extremity:				
Girdle	2	1	0	3
Arm	1	0	0	1
Forearm	3	3	1	7
Fractured lower extremity:				
Pelvis	0	0	2	2
Thigh	1	2	1	4
Leg	0	1	4	5
Ruptured viscus	1	1	0	2
Hemothorax	0	1	2	3
Ruptured brachial plexus	1	0	0	1
Extensive lacerations	0	3	2	5
	20	25	19	64

The injury most frequently complicating fracture in the cervical region was fractured skull, and a careful study of the records makes skull fracture probable in several instances where this injury is not specifically stated to have been present; in the dorsal region, fracture of the ribs is the most common injury; and complicating fractures of the lumbar spine, fractures of the lower extremity are most frequently noted. Of the seven fractures of the lower extremity noted as complicating injury to the lumbar spine, four were compound fractures. Hemothorax is noted three times, but in no instance was it recognized clinically. Necropsy revealed the condition.

The records of 107 patients who entered the hospital within forty-eight hours of the receipt of their injury is made the basis of the symptomatology of spinal fracture. This 107 includes 40 fractures of the cervical spine, 38 fractures of the dorsal spine, and 29 fractures of the lumbar spine.

Shock is noted in 24 instances; 3 times in cervical fracture, 11 times in dorsal fracture, and 10 times in lumbar fracture. In every instance of shock in fracture of the cervical vertebrae, there were also noted other severe injuries, and this holds true in 10 of the 11 instances of fracture in the dorsal region, and 8 of the 10 fractures in the lumbar region.

The histories of the 3 patients who showed shock without demonstrable injuries other than fracture of the vertebrae are detailed, because in these there is a reasonable doubt that the injury described was the only injury suffered.

One patient is said to have fallen a distance of 20 feet, landing on her head and shoulders, and presented the classical picture of a complete transverse lesion of the cord at the level of the fifth dorsal segment. No note is made of her mental state other than she was in a state of "considerable shock." She responded "fairly well" to stimulation, and within twenty-four hours was subjected to laminectomy, and died almost immediately after the operation, respiration failing. No autopsy was permitted.

Of the patients with fracture of the lumbar spine, one fell thirty feet into a vessel hold and landed on his "right buttock and side." He was dazed but able to stand with great difficulty. There were no paralytic symptoms and all his reflexes were normal. Fracture of the transverse process of the fifth lumbar vertebra is the only injury recorded, but does not seem enough to account for shock. The other patient with lumbar fracture was crushed by a falling boiler. He was a man of twenty-five. When seen in the accident room, he was unconscious and in a state of shock. There was no loss of motor power of legs. He died in half an hour, but "fracture of the fourth and fifth lumbar" is the only note of the injury. There was no autopsy.

If these three cases can be excepted, no patient with fracture of the spine, uncomplicated by other demonstrable severe injuries, was recorded as in a condition of shock when first seen.

From the data here presented, shock is not to be expected in uncomplicated vertebral fractures, and the presence of shock is indicative of additional injuries.

Neurological signs presented by the patients are shown in the following table:

	Cervical	Dorsal	Lumbar
Complete motor and sensory paralysis, sphincteric retention and absence of reflexes, superficial and deep	13	12	5
Complete motor and sensory paralysis, with sphincteric retention and absence of all reflexes, superficial and deep except the plantar	8	3	0
Complete motor and sensory paralysis with sphincteric retention, but notes on reflexes unsatisfactory	3	2	0
Complete motor and sensory paralysis with retention with presence of deep or superficial reflexes on one or both sides	5	3	0
Incomplete motor or sensory paralysis, sphincteric retention and complete absence of deep and superficial reflexes	0	1	1
Incomplete motor or sensory paralysis, sphincteric retention and complete absence of deep and superficial reflexes, except plantar	0	0	1
Incomplete motor or sensory paralysis with sphincteric retention but with difference in reflexes on two sides	3	0	1
Incomplete motor or sensory paralysis with retention of urine and feces with normal reflexes	0	1	1
Incomplete motor or sensory paralysis with retention of urine and feces with exaggerated reflexes	1	0	0
Incomplete motor or sensory paralysis with retention of urine and feces, but notes on reflexes unsatisfactory	1	1	1
No motor or sensory paralysis and normal reflexes, but sphincteric disturbances present	0	2	4
No motor or sensory paralysis, but sphincteric disturbances present and no note on reflexes	0	1	1
No motor or sensory paralysis, no sphincteric disturbance, but reflexes changed from the normal—diminished	1	2	0
exaggerated	0	1	0
No motor or sensory paralysis, no sphincteric disturbance, and normal reflexes	1	4	11
No motor or sensory paralysis, no sphincteric disturbance, but no notes on reflexes	1	2	0
No notes on paralysis or reflexes	3	3	3

If the presumptive signs of total transverse lesion of the cord are considered to be a total motor and sensory paralysis with abolition of all reflexes, deep and superficial, except the plantar,—below the injured segment,—and if the cases presenting complete paralysis and sphincteric disturbance but in which the record of the reflexes is not complete, be admitted as presenting signs of total destruction of the cord, there are 46, or 43%, of the cases which meet this definition, divided as follows: cervical, 24, or 60%; dorsal, 17, or 44.7%; lumbar, 5, or 17.24%.

Disturbance in sensation or motion, complete or incomplete, with paralyzed sphincters and reflexes present; normal, exaggerated, diminished, or unequal on two sides,—in other words, signs of cord injury, but not of complete destruction,—were present in 21 additional cases (19.6%), divided as follows: cervical, 10, or 25%; dorsal 6, or 15.8%; lumbar, 5, or 17.24%.

In 8, or 7.4%, of cases, sphincteric retention was the only symptom indicative of cord injury. This condition presented in 3, or 8%, of the dorsal cases, and 5, or 17.24%, of the lumbar fractures.

There remain a few cases who presented no neurological symptoms. Included in this number are 3 cases in which no note was made of reflexes, but in which there was no paralysis or sphincteric disturbance, and 9 cases, 3 in each region, in which no mention is made of paralysis or sphincteric disturbance or the condition of the reflexes: cervical, 6, or 15%; dorsal, 12, or 31.6%; lumbar, 14, or 48.3%; a total of 32, or 30%, of the cases.

Signs of severe cord injury were present in 67, or 62.6% of 107 patients seen within forty-eight hours of the receipt of the injury. In 46, or 43%, the signs on first examination pointed to a complete myelitis, and in 21, or 19.6%, the signs were of a partial cord destruction. Eight, or 7.4% of the cases, showed sphincteric disturbance of short duration, while 32, or 30%, presented no signs of medullary trauma. Roughly, two-thirds of the patients showed severe injury to the cord, and one-third presented slight or no signs of cord injury.

If the 3 regions of the spine be studied, the vast majority (85%) of fractures in the cervical region, and over half (59.4%) of the fractures in the dorsal region were accompanied by symptoms of serious damage to the cord, while two-thirds (65.5%) of fractures in the lumbar segment were accompanied by slight or no evidence of medullary trauma.

A fact of great importance is that, of the 67 patients who had signs of cord lesions, in 66 the onset of the paralysis was immediate, and in only 1 was it gradual.

Priapism was noted in 27 cases: cervical, 16; dorsal, 11; lumbar, 0; and with 3 exceptions (1 in the cervical and 2 in the dorsal region) in patients who presented signs of complete destruction of the cord. From these figures, therefore, the presence of priapism should be a bad prognostic sign.

Subjective pain at the site of fracture was conspicuous by the infrequency of its mention,—only 12 times in all; 3 times in fractures involving the cervical spine, 4 times in the dorsal segment and 5 times in the lumbar segment,—and the extent of the cord lesion had no apparent effect on the presence of pain; 6 had complete cord lesion, 2 incomplete cord lesions, and 4 no cord lesions.

Though conclusions based on small figures are

frequently erroneous, at least these figures suggest that the lower the site of the fracture the more likely is subjective pain to be prominent. In the present series it was present in 3 instances in 40 fractures in the cervical region, a percentage of 7; in 4 out of 38 in the dorsal region, 10%; and in 5 out of 29 in the lumbar region, or 17%.

The classical local signs of fracture of the long bones—swelling and ecchymosis, localized tenderness, deformity and crepitation—were applied to the present series.

Discoloration, swelling or contusion at the site of fracture are mentioned in 23 instances, or in 21.5% of the cases under consideration; 2 in the cervical region, 17 times in the dorsal region, and 4 times in the lumbar region.

Localized tenderness was noted in 67 instances, or in 62.6% of the cases: 22 times in the cervical region, 26 times in the dorsal region, and 19 times in the lumbar region.

Deformity was noted in 51 instances, or in 47.7% of the cases: in the cervical region 14 times, in the dorsal region 25 times, and in the lumbar region 12 times.

Crepitation was noted in but 8 instances, 7.5%; twice in the cervical region and three each in the dorsal and lumbar regions.

Localized tenderness over the spinous processes of the fractured vertebrae, or just lateral to the spinous processes, is the subjective sign most frequently noted in this series of cases, and the frequency of this sign is underestimated in the figures quoted, for in 7 instances where contusion or hematoma are noted, no note is made of localized tenderness. Moreover, a number of patients were unconscious when the examination was made, and in these cases the presence of tenderness could not be determined. It is, without doubt, fair to venture a general statement that localized tenderness is present in every instance of fracture of the spine. And as a corollary to this, localized tenderness over the spine should always suggest the possibility of fracture.

Fifty-five patients in this series of 133 were given an x-ray examination, with the results shown in the following table:

	Cervical	Dorsal	Lumbar
Patients examined	23	15	17
Fractures demonstrated	12	8	15
Negative	2	2	0
Questionable fracture	5	5	0
Unsatisfactory plates	2	0	1
Interpretation not recorded	2	0	1

Positive evidence of fracture was obtained in a little over one-half of the cervical and dorsal cases, but in the vast majority of the lumbar cases; included in the lumbar cases are 5 cases of fracture of transverse processes and 1 case of fracture of an articular process that, except for x-ray, would have gone unrecognized.

The 4 cases that were reported "negative" were clinically positive. One of the cervical cases had signs of complete and one of incomplete crush of the cord. One of the dorsal cases had signs of a transverse myelitis, and was further proven by operation to have sustained a fracture. The second dorsal case may be open to some question, for the patient presented no neurological symptoms, and the crepitus that was felt on examination might have been crepitus transmitted from a fractured rib which he suffered. This is the only doubtful case in the whole series.

Recent experience has shown that an absolutely satisfactory plate is necessary to make a diagnosis of fracture of the spine, and oft-times several exposures are necessary before such a plate is secured. And further, the usual antero-posterior views, though the plates be excellent, often do not clearly show a compression fracture that is unmistakable in a lateral view.

Except in the mid-dorsal region, where the scapulae are interposed, and in the low lumbar region, where in like manner the alae of the ilia are interposed, satisfactory lateral views have been obtained.

If repeated exposures had been made in all cases in the present series in which the plates were unsatisfactory, or in which, from the standpoint of the radiographer, the fracture was "questionable," or in which the x-ray and clinical findings were at variance, there can be no doubt that 100% positive findings would have resulted.

Lumbar puncture is not recorded as being done on any of the patients in this series, though it would seem, *a priori* that valuable evidence as to the condition of the cord might be acquired by this means. A study of the meagre data obtainable, however, indicates that conclusions as to the condition of the cord, drawn from the appearance of the cerebrospinal fluid, may be misleading. The character of the cerebrospinal fluid which escaped on opening the dura at operation, was noted in 8 instances: 5 times as bloody and 3 times as clear. All three of the patients whose cerebrospinal fluid was reported as clear presented the clinical signs of a complete transverse myelitis, and were operated upon within twenty-four hours after the receipt of their injury. In 2 of those cases the cord was not demonstrably injured, while in the third it appeared normal until incised, when cord mush was extruded. Two of the cases with bloody cerebrospinal fluid were operated upon within twenty-four hours of the receipt of the injury, one on the third day, one on the fourth day, and one on the fourteenth day after injury. In 4 cases the cord was found at operation to be completely severed, and in one instance no cord injury could be demonstrated, though the man showed clinical evidence of a severe, though not complete lesion of the cord. From these small figures, a bloody cerebrospinal fluid on lumbar puncture may indicate that the cord be lacer-

ated, but clear fluid does not exclude the possibility of severe trauma to the cord.

In this series 40 patients were subjected to operation, 38 to laminectomy and 2 to attempts to remove deformity by manipulation. Of the laminectomies, 11 were in the cervical region, 24 in the dorsal region, and 3 in the lumbar region.

The data obtained by a study of the records of the findings at operation are disappointingly incomplete, and from their study few conclusions can be drawn. In 38 laminectomies spinous processes are noted as fractured in 19 instances, laminae in 18 instances, and the posterior vertebral ligaments in but 2 instances. These figures suggest that in the mechanism of fracture the bodies are first crushed; if the causative flexion is continued the unyielding bony posterior arch yields to the force, before the elastic ligaments are finally ruptured.

Extradural hemorrhage was noted but twice, and then the blood extravasation was small. In one instance the dura is noted as "bruised," and in 2 instances as "lacerated." Subdural hemorrhage is noted twice, but the extent of the hemorrhage is not mentioned.

In 5 cases the dura was not opened. Of the 33 instances in which the dura was opened no note of the character of the cerebrospinal fluid is made in 25; in 5 instances it is noted as bloody and in 3 cases as clear.

The condition of the spinal cord itself is noted in 30 cases. In 12 instances it is noted as "crushed," once as "lacerated," once as "thinned," once as "slightly discolored." In 13 instances there was no demonstrable injury to the cord. In two instances the cord is noted as being "fairly normal in appearance" until it was incised, when in both instances, cord mush was extruded. In the 12 instances in which the cord was noted as crushed, in the one instance of "lacerated" cord, in the one instance of "thinned" cord and in the two instances where the cord appeared "fairly normal until incised," the clinical symptoms pointed to a transverse myelitis. The patient whose cord was "slightly discolored" was also paralyzed completely. Of the 13 instances in which there was no demonstrable injury to the cord, the symptoms pointed to complete destruction of the cord in 8 cases, and to partial destruction in 5 cases. In 2 cases where no lesion of the cord was demonstrated at the time of operation, autopsy proved acute traumatic softening.

These operative findings indicate that extradural and subdural hemorrhages, secondary to spinal fracture, are infrequent, and rarely large enough to account for compression symptoms. In none of the cases here reported could hemorrhage be considered a factor in the production of symptoms. Further, in not a single instance was bone pressure on the cord demonstrated.

Another interesting and significant point is emphasized by the operative findings; that a fairer estimate of the amount of cord injury was possible through the clinical manifestations than by palpation and ocular inspection of the cord. Moreover, it is shown that cord lesions may be demonstrated by incising the cord, that otherwise would escape unrecognized.

The following comparison of the progress of the patients treated by conservative and operative methods was made, to determine what advantages operative measures offered, as shown in a small series of cases.

The comparison can be most fairly made if cases presenting evidence of injury in the same spinal segment be treated separately, and if only recently injured patients be included. The 107 patients who entered the hospital within 48 hours of the receipt of their fracture will, therefore, form the basis for comparison. These cases are distributed as follows:

		Treated Expectantly	By Laminectomy
Cervical ...	38	27	11
Dorsal	38	17	21
Lumbar ...	22	19	3

In the cervical region, 38 cases form the basis of comparison; of these, 27 were treated expectantly and 11 by laminectomy. Two patients with fracture in the cervical spine, who were seen within forty-eight hours of the receipt of their injury, have not been included in the figures. In these two cases attempts were made to reduce the evident deformity by manipulation—a practice which is now generally considered poor.

Among the 27 patients who were treated conservatively, 6 had injuries other than fractured spine—5 with signs of complete and one of incomplete destruction of the cord—and 21 suffered fracture of the cervical spine only; 11 with signs of a complete myelitis, 6 of a partial myelitis, while 4 had no signs pointing to injury of the cord.

Five of the 6 patients with injuries in addition to the spinal fracture were either unconscious or in profound shock when first seen in the accident room, and the sixth gave a history of unconsciousness following his fall; in other words, their general condition was such as to put operation out of the question. Three of the six died within twenty-four hours, one lived two days, one lived three days, whose signs pointed to a subtotal cord destruction, and the mother of the sixth patient took her from the hospital on the nineteenth day following her injury, that she might die at home. She had been delirious the last four days of her stay in the hospital, her temperature was ranging between 99 and 106, and it was a matter of but a short time till death should relieve her suffering.

Ten of the eleven patients with signs of complete myelitis, but no other accompanying injuries, died in the hospital,—four died inside

of twenty-four hours, one in 3 days, one in 5 days, one in 6 days, one at the end of a week, one after 15 days, and one after 16 days. The eleventh patient remained in the hospital 8 weeks, when he was transferred to another institution. Not one of the patients in this class showed even symptomatic improvement during their hospital stay.

But two of the 6 patients died who suffered a cervical fracture and had signs of cord injury, but not of complete severance of the cord. One died inside of 24 hours and one at the end of three weeks, though the three weeks he lived produced no improvement in his condition. The remaining 4 patients made definite improvement. They were able to use their arms and hands to some extent, though in no instance perfectly; could all walk unassisted though awkwardly, and two regained control of their sphincters. Since leaving the hospital one patient has made a complete functional recovery, and at the end of a year was working at his old position as brakeman on the railroad.

The first definite improvement in these cases, as noted in the records, began between four days and two weeks after entrance to the hospital. The hospital stay varied from three to eleven and a half weeks.

Each of the four patients who suffered fracture of the cervical vertebrae, but who presented no signs of cord injury, remained in the hospital three weeks. During this period no symptoms developed. Two of these four have been seen a year or more after their injury and are perfectly well.

Eleven patients were subjected to laminectomy, and none of them had received injuries other than fracture of the cervical spine. Nine of this number on the first examination showed signs pointing to a transverse myelitis, and two had signs of cord injury, but not of complete destruction.

Seven of the nine patients with signs of complete cord destruction were operated upon within twenty-four hours of the receipt of the injury. One patient died on the table, and one patient stopped breathing as the operation was about to begin, and artificial respiration was necessary for some time before operation could be done. Two patients died inside of twenty-four hours, two inside of forty-eight hours, and one at the end of five days, one at the end of two weeks, and one lived within a couple of weeks of a year. With the exception of the last case, which was reported by Mixter and Chase,* no patient showed improvement before death. The last-mentioned case on entrance presented all the signs of a transverse myelitis with complete motor and sensory paralysis below the fifth cervical segment, retention of urine and feces and absence of all reflexes, superficial and deep. Two days after the operation, tactile sensation had begun to return. In a week tactile sensation was present over the arms, body and legs. Within two weeks the knee jerks and plantar reflexes had returned. Within a month motion had begun to return in arms and hands and legs. After eight months he was able to move himself about in a wheel chair, had moderate control over both sphincters and had some power in the muscles of his legs. The immediate cause of his death was a calculous nephritis. A post-mortem examination was made and sections of the cord at the site of the crush proved that the cord at this level had not been entirely disintegrated. One patient submitted to laminectomy on the fourth day following his injury. On recovering from ether he had great difficulty in breathing, but this passed off in twenty-four hours. During the three weeks following his operation that he remained in the hospital, no improvement in his condition was noted, and he finally died six weeks after his accident. One patient was operated upon six days after his accident. He remained in the hospital six weeks after his operation, but during this time he did not improve.

The two patients with signs of cord injury, but not of a complete crush, had laminectomy done, one on the third and one on the fifth day, but both died on the fourth day following their operation, without any evidence of lessening of the paralysis.

Summary of fractures in the cervical region: all six patients with injuries accompanying the spinal fracture died—five inside of a week. Ten of the eleven patients with fracture of the cervical vertebrae and no accompanying injuries, whose neurological signs pointed to a complete severance of the cord, died, the majority inside of two weeks, and none improved any before death. Four of the six patients with cord lesions, not complete, improved very markedly under conservative treatment, and four, who had no neurological symptoms on entrance, developed no symptoms during their stay in the hospital.

Of nine patients with fracture of the cervical spine and signs of complete severance of the cord, subjected to laminectomy, there was one operative death. Eight died in the hospital, the majority inside of two weeks, but a much smaller majority than in the same class treated conservatively. One patient only improved following the operation, and though his improvement was very great, the autopsy findings showed that the injury to his cord was not complete, and it is questionable whether like betterment had not taken place had no operation been done. Both patients with signs of a partial myelitis, who were operated upon, died inside of two weeks and showed no betterment following the operation.

In this small series of fractures in the cervical spine with signs of cord injury, the only benefit that was derived from operation was a

* Mixter and Chase: Annals of Surgery, 1904, Vol. xxxix, p. 495.

possible prolongation of a miserable existence in the patient with original signs of complete crush of the cord. That improvement does take place where the cord is not severed is shown by the progress of those patients treated conservatively. That laminectomy improves the chances for recovery is not shown in this small series of cases.

Thirty-eight fractures of the dorsal vertebrae were first seen within forty-eight hours of the receipt of injury, of which seventeen were treated conservatively and twenty-one subjected to laminectomy.

Nine of the seventeen treated conservatively had other injuries complicating the spinal fracture. Two had signs pointing to complete destruction of the cord, and both died,—one within twenty-four hours and the other within forty-eight hours of the accident. One patient, the victim of a cave-in that crushed his chest, producing a subcutaneous emphysema, as well as fracturing his dorsal spine, presented signs of subtotal cord destruction; some sensation remained in the flaccid legs, though all reflexes and sphincteric control were lost. During the seventeen weeks he remained in the hospital he improved symptomatically in that the original hyperesthesia of the skin lessened, and he acquired the power of moving certain muscles in his legs a bit, but he failed in that time to regain control of his sphincters, and no note of the return of reflexes is made in the records. Two patients were moribund when first seen, and examination to reveal the extent of cord injury was unwarranted. Four patients had no symptoms pointing to cord injury. Three of the four died inside of forty-eight hours, and in one case the vertebral lesion was discovered at autopsy. The remaining patient stayed in the hospital three and a half weeks, during which time no signs pointing to cord injury developed. Of eight patients who suffered vertebral fracture alone, two had signs of injury to the cord, but not of complete destruction, and made complete recoveries. Loss of sphincteric control and inequality of the knee jerks, persisting for four days, were the cord signs presented by one of these patients, and the other patient had urinary retention and loss of the abdominal and patellar reflexes on one side, though no motor nor sensory paralysis was notable. In ten days the sphincteric disturbance had passed. During the month he remained in the hospital no new symptoms developed. Six patients who had no signs of cord injury were kept in the hospital under observation from one to three weeks, during which time no pressure symptoms developed.

Only four of the twenty-one patients on whom laminectomy was done had injuries other than spinal fractures, three presenting signs of complete and one of incomplete myelitis. Two of the three complete myelitis cases had suffered broken ribs, and a third a double Colles' fracture. All were operated upon within twenty-four hours of the accident. Two died, one in five and a half weeks and one in ten weeks. The third patient was alive a year after his discharge from the hospital, but he had not improved and was bedridden. The patient with a partial myelitis received fractures of both femora and fractured ribs, as well as a fracture of the spine, but on entrance no cord symptoms were noted. On the morning of the second day, in dressing his legs, it was found that sensation was absent. In the evening all power of motion had been lost. Laminectomy was done on the fourth day, and he died on the sixth, experiencing no benefit from the operation.

The remaining seventeen patients had no other injuries than the vertebral fracture. Thirteen on entrance showed signs of a complete transverse lesion of the cord, two of a partial injury to the cord, one had no medullary symptoms, and in one case the results of examination are not stated in the records. Eight patients with symptoms of complete crush of the cord and the one patient whose record is incomplete, were operated upon within twenty-four hours of the receipt of their injury. One death occurred on the operating table, one death an hour after reaching the ward, one died after seven weeks and one after four months. Four patients were unimproved on discharge from the hospital, one to four months after operation. One patient, who improved not at all during the five months succeeding his operation that he remained in the hospital, was reported to have improved symptomatically during the next six months in that "reflexes returned in both feet." In eighteen months from the date of injury he reports that he could distinguish between heat and cold in right foot and left thigh, but that he had no control over sphincters and had regained no motor power in the legs. One patient with symptoms of complete crush was operated upon forty-eight hours after his injury. Within two days motion was noted in the toes; within ten days the zone of anesthesia had fallen two inches and plantar reflexes were obtained, but there was no improvement in sphincteric control or motor power, and in the following two weeks no gain took place. He died during the ensuing year. Laminectomy was done on one patient on the fourth day, and he died four days after the operation; another patient submitted to operation on the fifth day and within two weeks of the operation his knee jerks had returned, but the following two months yielded nothing more. One patient developed delirium tremens the day after his injury, and operation was postponed for two weeks, but no improvement followed during the next two months.

Two patients were operated upon whose symptoms pointed to cord injury but not to complete crush. One patient on entrance presented a flaccid paralysis of both legs, with abolition of patellar and plantar reflexes, retention of

urine and feces, but sensation in the legs was not lost, though somewhat dulled. Laminectomy was done within twenty-four hours. In three days after the operation sensation in the legs was normal; in twelve days there was a slight power of motion in the left foot; in a month he could voluntarily control the right calf muscles; in six weeks he could turn in bed without help; in two and a half months he regained control of his bladder; in six months he could stand with support, but complete control of the muscles of his lower extremities had not been acquired. The second patient on entrance had a partial motor paralysis of the right leg and a hyperesthesia of the legs, with sphincteric retention, but reflexes unaltered from the normal. Operation was postponed, on account of poor general condition, for seven days, but in the meantime he had recovered control of his sphincters, and had regained the motor power in the right leg to a large extent. Progressive betterment continued after operation. Four weeks after the operation all symptoms referable to the cord had disappeared, and in six weeks after the operation he was discharged on crutches.

The patient who had no cord symptoms was subjected to laminectomy within twenty-four hours. He remained five weeks in the hospital and developed no neurological symptoms.

Summary of fractures in the dorsal region: As in the cervical region, fracture of the dorsal spine, accompanied by other injuries, is very fatal, whether the cord be apparently totally or incompletely destroyed. Seven of nine patients thus injured died within forty-eight hours of their accident. Two patients with dorsal fracture, uncomplicated by other injuries, had medullary symptoms, though not symptoms of complete severance of the cord, and made complete recoveries. Improvement began between four and ten days after the receipt of the injury. Six patients with fractures and no signs of cord injury developed no medullary symptoms during the period of hospital observation.

Operative treatment certainly shortened the lives of two patients among the twenty-one subjected to laminectomy,—one death on the table and one an hour following operation. With one exception, the accompanying injuries of those patients operated upon who received other injuries than the vertebral fracture, were less severe than among those treated conservatively, and though three of the four died, they lived longer than those who were treated by palliative methods. The fourth patient reaped no benefit from his operation. Thirteen patients with fracture of the dorsal spine with signs of transverse myelitis but no accompanying injuries, were the subjects of laminectomy. Six died, two immediately after, three within four months, and one inside of a year. Five showed no improvement during their hospital stay. One patient who died and two patients who were discharged from the hospital showed slight symptomatic improvement after operation, but did not regain lost function. Two patients with signs of incomplete cord injury, made marked progress. One of these patients had gained considerably before operation was done; and the gain in the other case was very slow and the rôle the laminectomy played is open to question.

The results of laminectomy in fractures of the dorsal spine, as in fractures of the cervical spine are no better than the results of conservative treatment, and in this series of dorsal fractures laminectomy resulted in two deaths. Such improvement as followed operation in these cases cannot be credited to the operation, since patients who were treated conservatively made equal gain. The indication for operation on the patient who had no cord symptoms is not clear, since four patients under similar circumstances, treated conservatively, developed no cord symptoms.

With fracture of the lumbar spine, nineteen patients were treated conservatively (patients who received simple process fractures have not been included in this number) and three treated by laminectomy.

Ten of the nineteen cases treated by conservative methods sustained other injuries than the spinal fracture. Two showed signs of complete crush of the cord, and both died—one inside of twenty-four hours and the other in three weeks; two others were moribund on entrance and died within a few hours, and examination to determine the extent of the cord injury was unwarranted. In six instances the spinal injury, associated with other injuries, was accompanied by signs of cord injury, but not complete destruction. Three of these patients died within twenty-four hours. In two instances the only sign of cord injury was loss of control of the sphincters, lasting in one case four days and in the other twelve days. In the sixth patient, who had suffered compound comminuted fracture of both legs, loss of sensation in the legs was first noted while changing the dressings. It was obviously impossible at this time to test for motor paralysis. She remained in the hospital four months, during which time she regained control of her sphincters. When her plasters were removed six weeks later, tactile sensation had returned in her legs, but there was considerable loss of motor power and loss of patellar reflexes. She was, however, able to get about on crutches. In the following two years there was no further gain.

Of nine patients with fracture of the lumbar spine, unaccompanied by other injuries, one patient presented signs of a complete transverse lesion of the cord, five presented cord symptoms, but not of a complete severance, and three had no signs pointing to medullary injury. The patient with the complete transverse myelitis remained but one day in the hospital, since operation was not advised. In two patients loss of control of sphincters for two or three days was

the only sign of cord involvement, and no other signs developed during the month each remained under observation in the wards. One patient on entrance had total loss of sensation below the knees on both sides, retention of urine, abolition of patellar and plantar reflexes, but retained slight motor power in both legs. In ten days sensation had returned almost completely in one leg, and the opposite foot alone was anesthetic. He was also able to flex and extend his legs, though there was no power over ankles or toes. In five and a half weeks he was able to pass his urine voluntarily, but there was no increase in muscle power. Another patient's cord symptoms consisted in numbness of the legs and unequal patellar reflexes. His bladder control was not affected. He developed delirium tremens on the second day. At the end of two weeks, when he was transferred to the psychopathic hospital, the numbness of the legs had been replaced by a hyperesthesia. No note was made on the reflexes on discharge. The last patient in this group had an anesthetic strip over the outer aspect of one leg. There was no noted paralysis and no bladder symptoms. At the end of a month he walked from the hospital, but no record is made as to the anesthetic zone at this time. Each of the three patients with lumbar fracture and no cord symptoms remained under observation for three weeks, and, since no signs referable to the cord had developed, was discharged.

Only three patients with fracture of the lumbar vertebrae were subjected to laminectomy. Each at the first examination presented a total motor and sensory paralysis below the injured cord segment, with retention of urine and feces, and loss of both superficial and deep reflexes. In two instances, operation was done within twenty-four hours. In one instance, two days after operation, there was a marked lessening of the extent of the zone of anesthesia and in three weeks slight power was present in the adductor group of muscles of one leg, but at the end of six months he had improved no more and was transferred to another institution. The other patient made no gain after operation, and died in eighteen days from a septic meningitis secondary to the operation. The third patient was operated upon four days after his injury, but in the following two months no betterment had resulted and he was transferred to another institution.

Summary of lumbar fractures: As in the two other segments of the spine, fractures in the lumbar region, accompanying other injuries, are generally fatal, and regardless of whether the cord lesion is complete or partial. Seven deaths within twenty-four hours and one death within three weeks among ten patients thus injured tells the story. Where there were no accompanying injuries the cord injuries associated with lumbar fractures are less severe than in the other two segments. Thus among nine patients treated conservatively, one case only presented signs of a complete medullary lesion, and his hospital stay was too short to permit any statement to be made concerning him. All of the five patients with incomplete lesions of the cord made marked improvement, four of the five being practically normal on discharge. Three patients had no signs of cord injury on admission, and developed no signs while in the hospital.

Of three patients subjected to laminectomy, the operation must be held responsible for one life, death being due to a postoperative septic meningitis. In one instance following operation there was symptomatic improvement, and in one instance no betterment. The number of patients in this group who submitted to laminectomy is too small to allow any conclusions to be drawn.

Taken as a whole, the results of laminectomy in this series of fractures of the spine do not justify an argument in favor of operation, but on the contrary serve as a warning against radical surgical treatment. Four deaths to which operation directly contributed in thirty-five patients operated upon, is a high mortality. But six patients among the thirty-five made any improvement following operation, and in three of these cases the improvement was symptomatic only. Among the three who made decided improvement, in one case the gain had begun before operation was done, and in the two other cases it is perfectly reasonable to suppose that like improvement would have followed had no operation been done. Certainly operation is not justified unless it offers the patient a better chance for recovery than conservative treatment.

In this series of cases, with one exception, the onset of paralysis did not succeed the injury, but was the direct accompaniment of it. The paralysis was present before the effect of hemorrhage or edema or bone pressure could work on the cord. Furthermore the anatomy of the cord and its membranes differs markedly from that of the brain in that the brain lies closely apposed to its dura, whereas the cord hangs so loosely in its dural envelope that a very considerable hemorrhage may occur within the dural sheath and no compression of the cord result, and there is ample room for any swelling of the cord from secondary edema. Bone pressure following the causative accident must be rare, judging from the present series, for bone pressure was not demonstrated at operation in any of the patients subjected to laminectomy. If permanent bone pressure be present, it results from so great a dislocation of the vertebrae that the spinal canal is narrowed to limits smaller than the diameter of the cord, and in such instances, irreparable damage has been done before operation can be accomplished, and no gain should be expected.

Furthermore, Taylor's[1] observations, that cord lesions occur at a distance from the level

[1] Taylor, E. W.: Journal Boston Society of Medical Science, 1898, Vol. iii, p. 60

opposite the site of fracture, seems to be given no weight by those authors who are enthusiastic proponents of routine laminectomy in cases of vertebral fractures with accompanying cord symptoms. In the series of cases under discussion, autopsies were performed on nineteen cases, and in three of this number areas of softening of the cord substance are described at a distance from the site of the original injury.

One instance with fracture of the fourth dorsal showed "region of softening about one centimeter in length at level of fourth dorsal, and another, somewhat larger, at level of ninth and tenth dorsal vertebrae. Serial sections one centimeter apart, show in regions of softening loss of structural markings and softening of substance of the cord almost to diffluence, the cord at these levels being grayish white and at these points but slightly diminished in size."

In another instance in which first and second lumbar vertebrae were fractured "the pia-arachnoid in mid-dorsal region for a distance of twelve centimeters below the cervical enlargement deeply blood stained. The consistency of the upper and lower levels of the cord natural; that of the thoracic segment a little diminished."

In the third instance the fifth cervical vertebra was injured. "The lower two-thirds of the cervical enlargement somewhat flattened and soft. Reflection of the dura shows no subdural hemorrhage. Section through the cervical enlargement yields pale, gray-red, pulpy semi-diffluent material. Section through lower part of enlargement shows hemorrhage into the right ventral and left dorsal horns, with yellowish softening at centre of the areas. On cross section, dorsal segment at a point seven centimeters below the cervical enlargement is slightly softened, and on section shows a central area, grayish-red and semi-diffluent. This condition limited to a region about one and five-tenths centimeters in length. On serial section, elsewhere normal."

In this small series of cases on which necropsy was done, sixteen per cent. showed cord lesions so remote from the site of injury that an ordinary laminectomy would completely fail to reveal them.

Several patients in this series, who originally presented signs of a complete transverse crush of the cord, improved to a greater or lesser degree, thereby proving that the cord had not been destroyed, and add to the accumulating evidence that the extent of the cord damage cannot be absolutely determined on first examination.

Laminectomy cannot be considered other than a major operation which carries a definite mortal risk with it, and the desperate condition of a patient does not warrant the surgeon in adding the risk of operation unless there is more than a visionary chance of bettering a hopeless condition. A major operation is not justified on the basis that it will do no harm, and can conceivably, though improbably, do good.

From a study of the data here presented, the writer believes that laminectomy is absolutely contraindicated in patients in shock or who have received demonstrable injuries in addition to the spinal fracture and the cord injuries accompanying it; that laminectomy is contraindicated in patients with fracture of the cervical spine, whose respiration is embarrassed by paralysis of the intercostal muscles; that laminectomy is contraindicated in all patients whose paralysis accompanied the accident, and was noted immediately after accident; that laminectomy is contraindicated before the fourth day of convalescence, because where improvement takes place such improvement cannot be expected to manifest itself before the fourth day; that laminectomy is contraindicated in all patients who are improving under conservative treatment, and laminectomy cannot be expected to better conditions if improvement, once shown, comes to a standstill; laminectomy is contraindicated in patients whose vertebral fracture is unaccompanied by medullary symptoms.

Laminectomy is indicated in the rare cases of gradual onset of medullary symptoms, and in patients who, originally free from cord symptoms, begin to develop symptoms referable to the cord.

In conclusion, the study of this series of cases seems to warrant the following deductions: Fracture of vertebral bodies is generally caused by a hyperflexion of the spine first crushing the bodies; if the flexing force is continued the inelastic posterior arch gives way before the more elastic interspinous ligaments. Fracture of vertebral processes occurs in the lumbar region and results from direct trauma.

The mid-cervical and dorso-lumbar regions of the spine are most frequently injured.

Tenderness over the site of injury is the most frequent and reliable sign of vertebral fracture.

Shock is not common in vertebral fracture, regardless of the accompanying cord lesion, and the presence of shock is indicative of complicating injuries.

The presence of priapism is a bad prognostic sign.

Injury to the cord, where present, is an accompaniment of the spinal fracture in a very large majority of cases; not secondary to hemorrhage or edema or persisting bone pressure, which are of relatively rare occurrence.

Laminectomy in this series has been accompanied by a definite operative mortality, and operative treatment in the present series has not shown better results than conservative treatment. Laminectomy is contraindicated in all patients who have received injuries in addition to the spinal fracture, and in all patients with uncomplicated vertebral fracture, whose cord injury accompanied the fracture, until at least four days have passed—the minimum time for spontaneous improvement to manifest itself.

THE CLASSIFICATION OF HAY-FEVER POLLENS FROM A BIOLOGICAL STANDPOINT.

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THE knowledge of the exact pollens which cause hay-fever is important from an etiological as well as from a prophylactic and therapeutic standpoint. In the prevention of hay-fever, we must know the plants which produce the noxious pollens in order to eradicate them or prevent them from reaching their pollinating stage, and, where these measures are not feasible, to have the patient avoid localities infected with these pollens. This knowledge is equally necessary from a therapeutic standpoint, as the modern treatment of hay-fever gives special prominence to methods, the correct application of which requires the knowledge of the proper hay-fever pollens.

Hay-fever pollens are not deleterious to health *per se*, as the great majority of persons (99%) are not inconvenienced by them. Those suffering from hay-fever have a special susceptibility or lower resistance which modern methods attempt to correct by immunizing the patient against these pollens.

The usual method of testing the susceptibility of the patient by applying an extract of various pollens to the conjunctival sac or scarified skin is not scientifically correct, as the question is not whether a patient reacts to various pollens, but whether he is sensitive to the pollen to which he is exposed.

We have, for instance, found many persons in the East susceptible to the pollen of the Western mugwort (Artemisia heterophylla), but the therapeutic use of this extract, in spite of the patient's reaction, would not be indicated in New York or Pennsylvania, as this weed is found in the Pacific States and not in the Eastern or Southern States. In the same manner, many patients in California react to the pollen of the common rag-weed (Ambrosia elatior), but the use of this extract would not be advisable in California as the common ragweed is not found in that State.

The correct test of the patient's susceptibility, therefore, should be directed to the pollen to which he is exposed. This may easily be determined by the atmospheric-pollen plates and the information obtained from these should form the basis of applied pollen therapy.

ATMOSPHERIC-POLLEN PLATES.

The atmospheric-pollen plates are ordinary glass slides used for the microscope, the central square inch being covered with a uniform coating of glycerin. In localities in which the humidity causes too great liquefaction of the glycerin, we use a thin coating of boiled linseed oil.

When these plates are examined, we apply an ordinary thin glass cover, and place the slide on a mechanical stage, so that the whole field may be traversed. As the glycerin leaves a surface of uneven refraction, it is necessary to inject a solution that will correct this. We use the ordinary Lugol's solution of iodine and iodide of potash, which not only corrects the refraction, but simplifies the identification of the pollens.

All the grass (gramineae) pollens, on account of the high percentage of starch, are stained blue-black (Fig. 1) which easily distinguishes them from all the other pollens. The members of the Ambrosiaceae group, including the ragweeds, marsh elders, gaernerias and cockle burs, are stained brown by the iodine, and are recognized by the spicules (Fig. 2). The amaranths (Amaranthus spinosus), chenopods (Chenopodium anthelminticum) and docks (Rumex crispus) have a medium percentage of starch, and are partly stained by the iodine. These pollens are spherical and smooth.

The wormwoods (Artemisias) are stained brown and are recognized by their three-lobed appearance when seen from the end; otherwise they appear ovoid with one of the lines of the lobes showing longitudinally (Fig. 3).

In our biological laboratory, where we have the photomicrographs of over two hundred pollens, their identification is not difficult. Ordinarily, however, the number of varieties of atmospheric-pollen appearing on the plates is not great, and it soon becomes easy to identify them.

While several varieties of pollen are usually found, the important pollen is distinguished by its great numbers (Fig. 4). The occasional appearance of a new pollen on the plates is not of any importance.

After the pollens have been identified and counted, they are estimated on the basis of the number per square centimeter for twenty-four hours. This number, which has a definite relation to the number of pollen per kiloliter of air,[1] is important in its bearing on the development of hay-fever and its severity. With most pollens, 25 per square centimeter indicates that there is sufficient pollen in the air to cause hay-fever in most subjects, and 100 that the number of pollens will cause attacks of considerable severity. In the case of the wormwoods (Artemisias) a much smaller number is sufficient to produce this effect.

The use of the atmospheric-pollen plates is as necessary in hay-fever as making a blood test in malaria. Its value was recently demonstrated in determining the cause of an outbreak of hay-fever in Austin, Texas. Our atmospheric pollen plates were exposed by Dr. S. N. Key, and sent to our biological laboratory. The ex-

amination of these (Fig. 18) showed that the air contained an average per kiloliter of 88 pollens of the mountain cedar (Sabina sabinoida), the biological test of which showed a marked hay-fever reaction. As the cedar has not, heretofore, to our knowledge, been identified with hay-fever, the importance of the atmospheric-pollen plates in such cases was clearly demonstrated.

WIND-POLLINATED PLANTS.

The etiology of hay-fever has been greatly simplified by the knowledge that only atmospheric-pollens are responsible for hay-fever, and that these are generated only by wind-pollinated plants.[2] This fact, which we have advocated for some years, has been confirmed during the past year by the records of our atmospheric-pollen plates, and by the results of our microscopic examinations of hay-fever secretions.

As bright colors and odors in flowers are intended to attract insects, these are never responsible for true hay-fever. Some of these, such as the goldenrod, sunflower, sneezeweed, etc., have toxic* pollens, but as these are not atmospheric they do not cause hay-fever except on direct inhalation. The wind-pollinated plants are devoid of all attractive colors or scent, and the "flowers" or florescence are often overlooked as such, as is the case of the rag-weeds, cockle burs, amaranths, wormwoods and grasses.

All pollens from anemophilous (wind-pollinated) plants are not responsible for hay-fever, as, for instance, the sedges, rushes, pines, and many other trees. All persons susceptible to hay-fever are not susceptible to the same pollens. Many persons, for instance, suffer during the spring from the grass pollens, and recover when the atmospheric-pollen plates show that these have disappeared. Shortly afterwards, when the rag-weed pollens appear in the air, the majority of these are free of hay-fever, in spite of the fact that the rag-weed pollens usually produce a more severe reaction.

On the other hand, persons susceptible to the rag-weed pollens usually appear to be without discomfort during the spring in spite of large numbers of grass pollens in the air, but quickly develop hay-fever when the rag-weed pollens appear.

In addition to these two forms of hay-fever, we have patients who are susceptible to both grass and rag-weed pollens, and these are the unfortunates who suffer during both periods of hay-fever.

There are also various degrees of reaction among the hay-fever pollens. The most active pollens that we have tested are the wormwoods (Artemisias) of the Pacific and Rocky Mountain States. The pollen of the California mugwort (Artemisia heterophylla), for instance, will cause a reaction ten times more severe than the common rag-weed. Next to the Artemisias, we have found the rag-weeds (Ambrosias) most active, the pollen of the grasses (Gramineae) being less active than the rag-weeds.

There are also many pollens which will produce a hay-fever reaction in susceptible persons only when inhaled in very large numbers or, in lesser numbers, when inhaled by patients already suffering from hay-fever. Among these plants are the chenopods or goose-foot (Chenopodium anthelminticum, Fig. 5, album, etc.), careless weeds (Amaranthus spinosus, Fig. 6), docks (Rumex crispus, Fig. 7, obtusifolius), Western water hemp (Acnida tamarascina, Fig. 8), etc.

These plants cause hay-fever only when growing in sufficient numbers near the patient. If his residence is surrounded by such plants so as to cause a concentration of atmospheric-pollen, he may suffer considerably, but this is not the case when these weeds are at a distance of four or five city blocks. In the case of active pollens, such as the rag-weeds, this distance is not sufficient to protect the patient from their effect.

CLASSIFICATION OF HAY-FEVER PLANTS.

While the prevention of hay-fever by the eradication of the hay-fever weeds is of the highest importance, it will evidently be some time before this becomes sufficiently general to eliminate the question of treatment. While most cases of hay-fever are due to the pollen of noxious weeds, there is also a certain number of cases which are due to plants of practical use, as, for instance, rye and other grains, mountain cedar, etc. In view of this, treatment will probably continue to be an important consideration in hay-fever.

Among the various treatments which have been tried, pollen therapy has, thus far, given the most encouraging results. The number of plants, however, which may cause hay-fever is exceedingly large. Of the Artemisias, the most important hay-fever plant of the Pacific and Rocky Mountain States, there are about two hundred varieties. There are about fifteen varieties of rag-weed (Ambrosias), and as many of the marsh elders (Ivas) and cockle burs (Xanthiums), while of the grasses (Gramineae), there are several thousand varieties.

If the application of pollen therapy required the use of the extract of the same pollen to which the patient is sensitive, it would make this method clearly impracticable, especially as most patients respond to many different pollens.

We have conducted a careful series of investigations with a view of dividing all the most common hay-fever pollens into groups which should be morphologically alike, and the number of which should be as few as possible, in order to simplify the question of pollen therapy. Thus far, we have succeeded in reducing the number to four groups. Should we succeed in finding a pollen which would morphologically

* "Toxic in this connection refers to the positive reaction in hay-fever subjects. The existence of true toxins in these pollens is still being investigated.

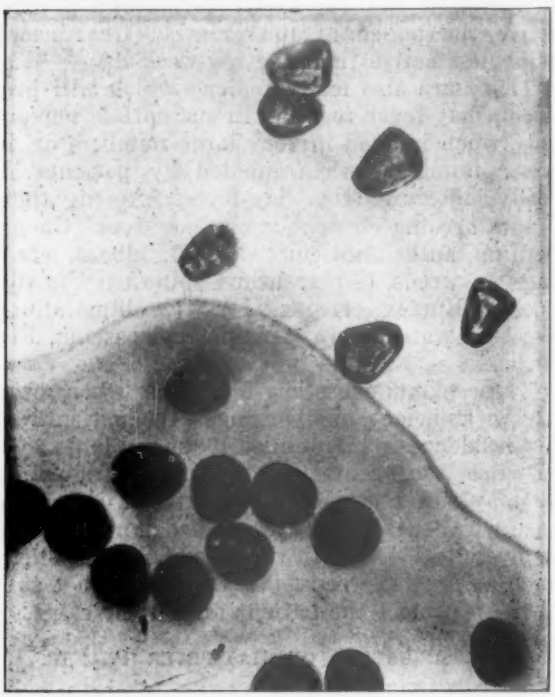

FIG. 1.—Grass pollen, showing effects of iodine solution (June grass, Poa annua). Magnified 350 diameters.

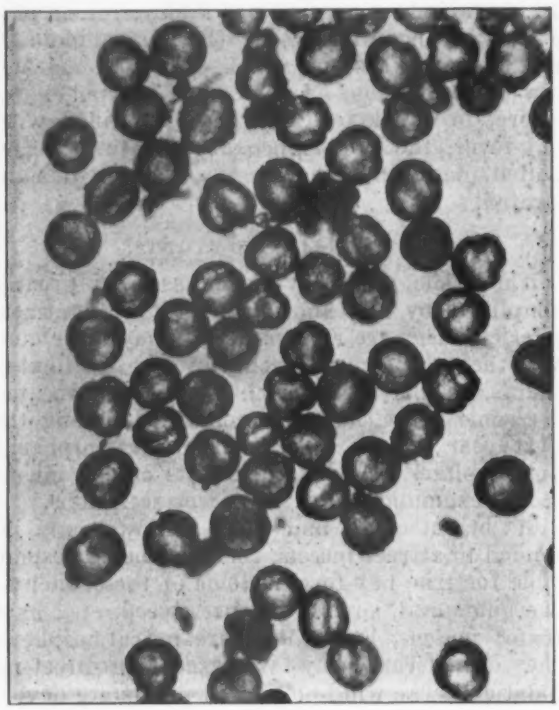

FIG. 3.—Pollen of Wormwood (Artemisia heterophylla). Magnified 350 diameters. The three-lobed pollen is characteristic of all the Artemisias.

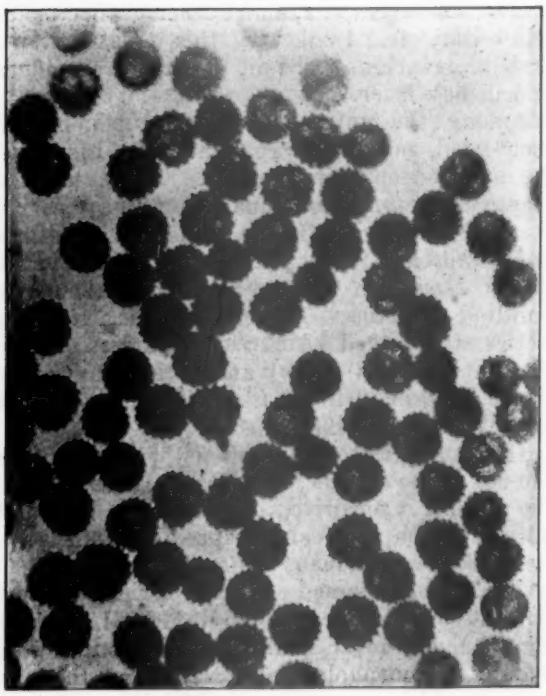

FIG. 2.—Pollen of Common Rag-weed (Ambrosia elatior). Magnified 350 diameters. All members of the Ambrosiaceae are recognized by their spicules.

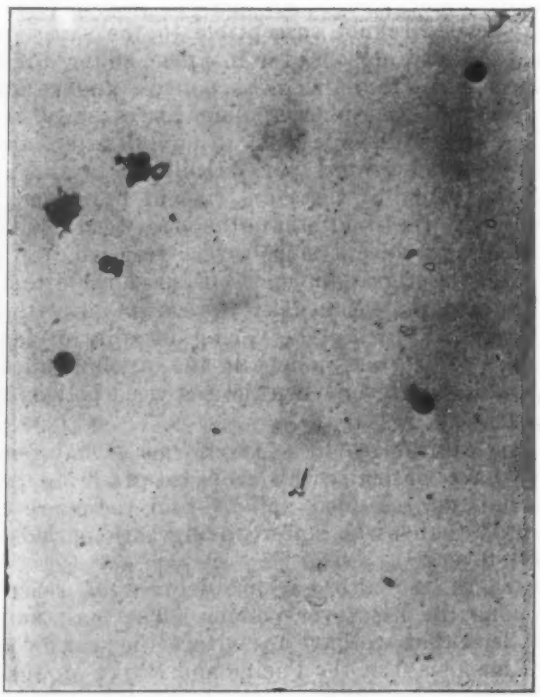

FIG. 4.—Atmospheric-pollen plate at biological laboratory, showing three trifida Rag-weed pollen and dust (principally of vegetation). Magnified 90 diameters.

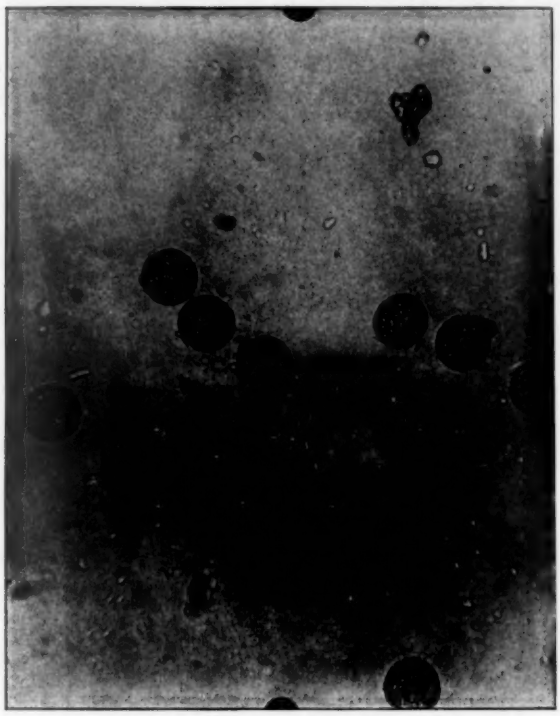

Fig. 5.—Pollen of Goose-foot (chenopodium anthemintícum). Magnified 350 diameters.

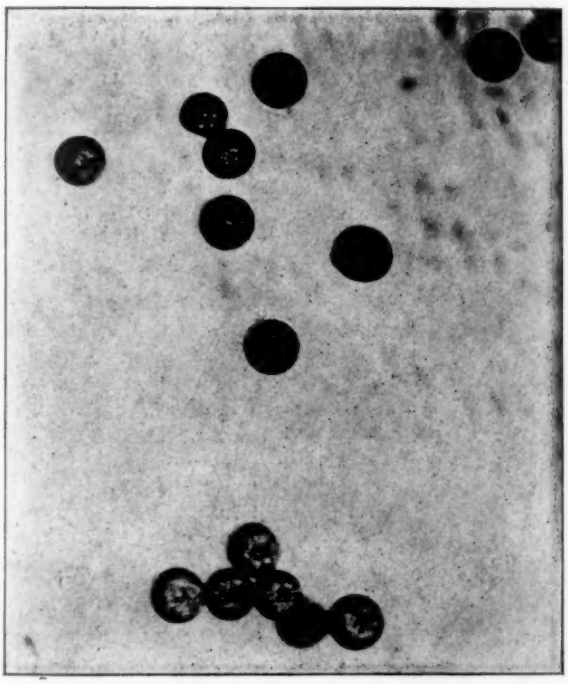

Fig. 6.—Pollen of Careless Weed (Amaranthus spinosus). Magnified 350 diameters.

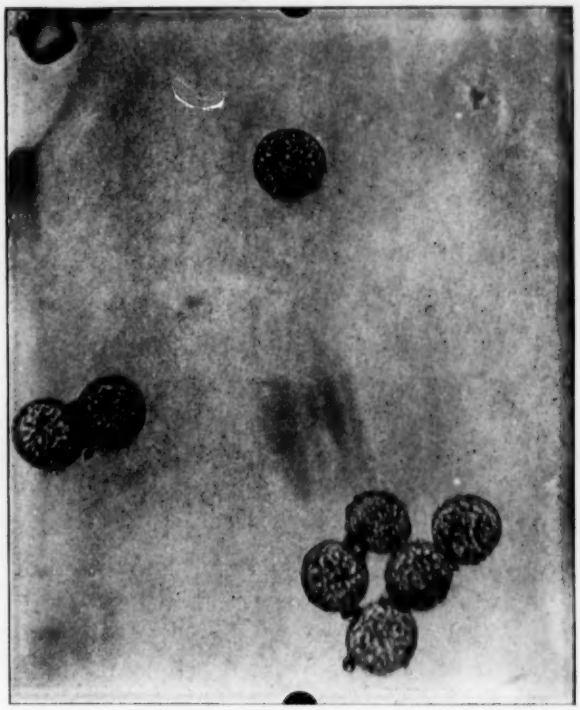

Fig. 7.—Pollen of Curly Dock (Rumex crispus). Magnified 350 diameters.

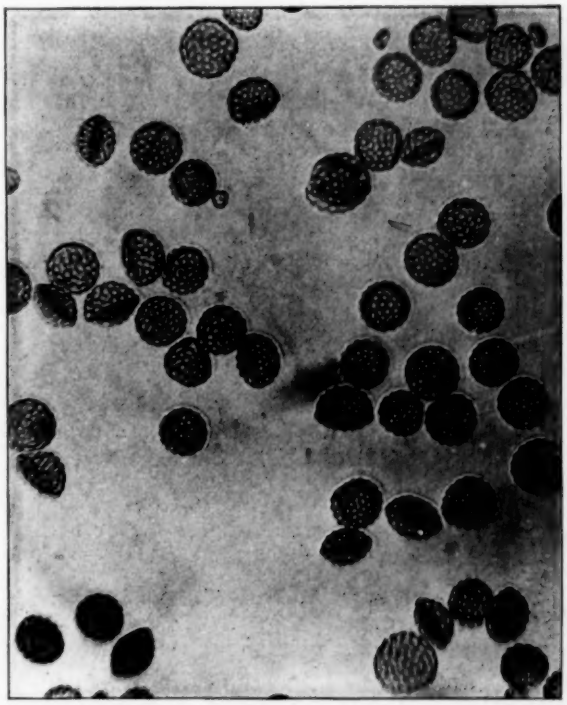

Fig. 8.—Pollen of Water Hemp (Acnida tamarascina). Magnified 350 diameters.

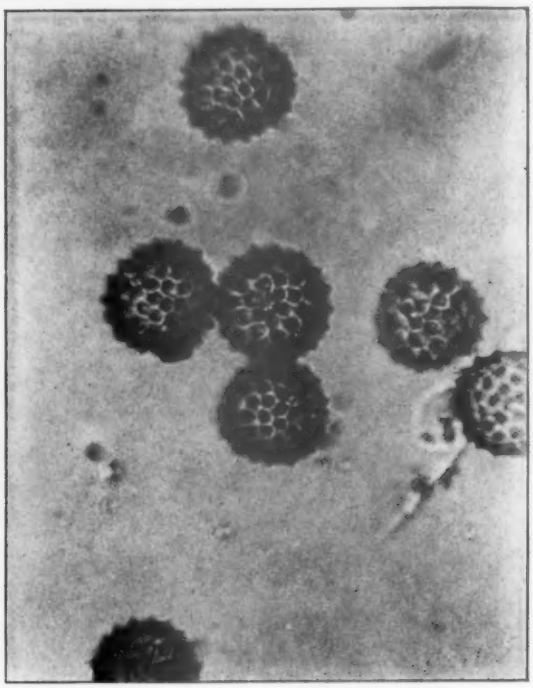

FIG. 9.—Pollen of Giant Rag-weed (Ambrosia trifida). Magnified 700 diameters.

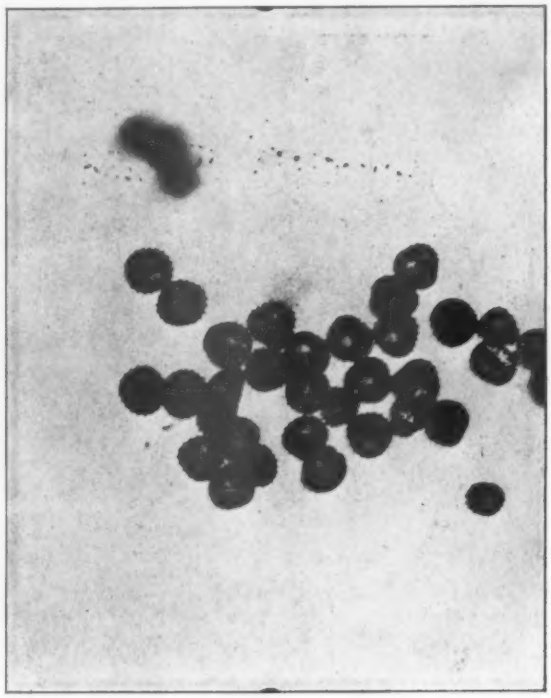

FIG. 11.—Pollen of Gaertneria tenuifolia. Magnified 350 diameters.

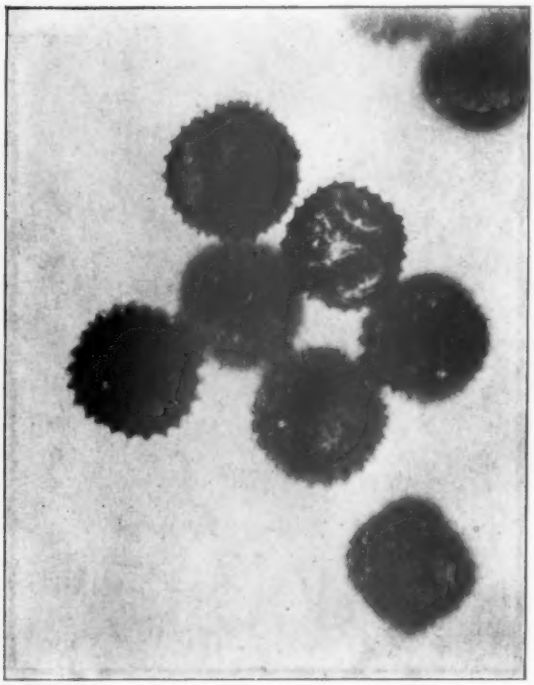

FIG. 10.—Pollen of Western Rag-weed (Ambrosia psilostachya). Magnified 700 diameters.

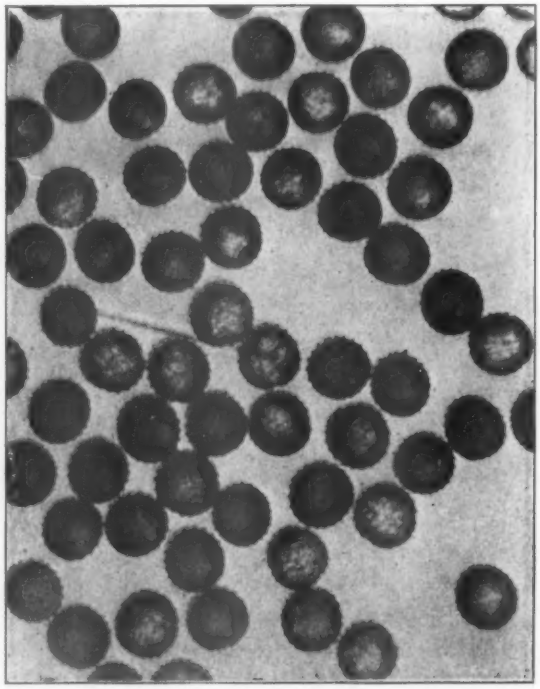

FIG. 12.—Pollen of Marsh Elder (Iva ciliata). Magnified 350 diameters.

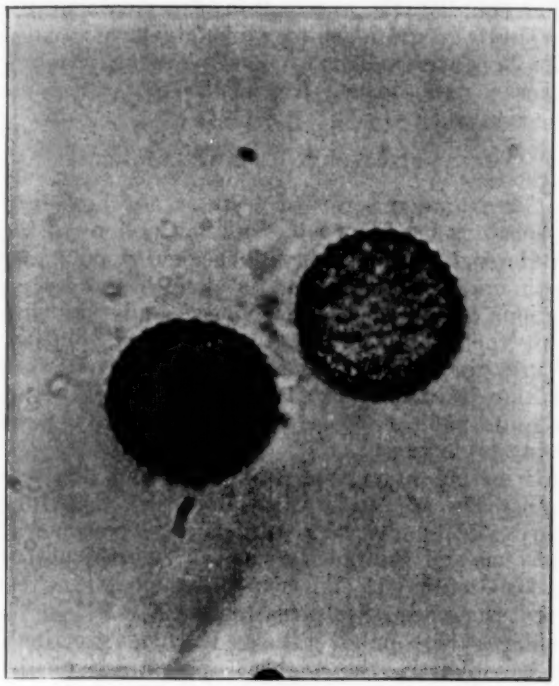

Fig. 13.—Pollen of Cockle Bur (Xanthium canadensis). Magnified 700 diameters.

Fig. 15.—Pollen of Wheat. Magnified 350 diameters.

Fig. 14.—Pollen of Corn. Magnified 350 diameters.

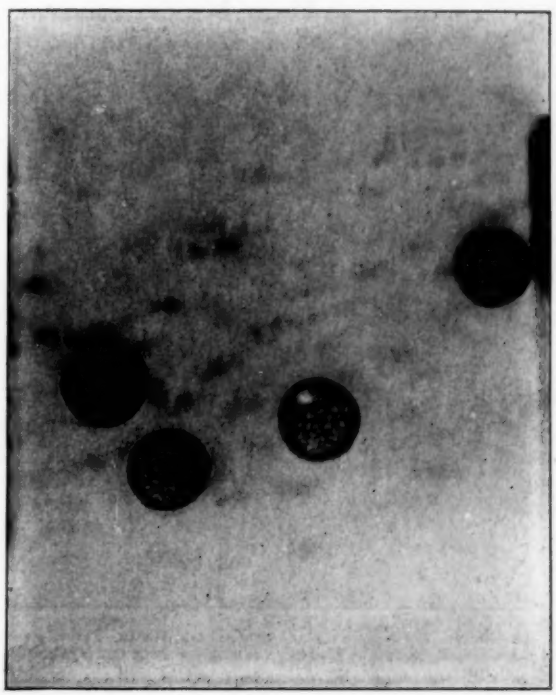

Fig. 16.—Pollen of Cockspur Grass (Panicum crus-galli). Magnified 350 diameters.

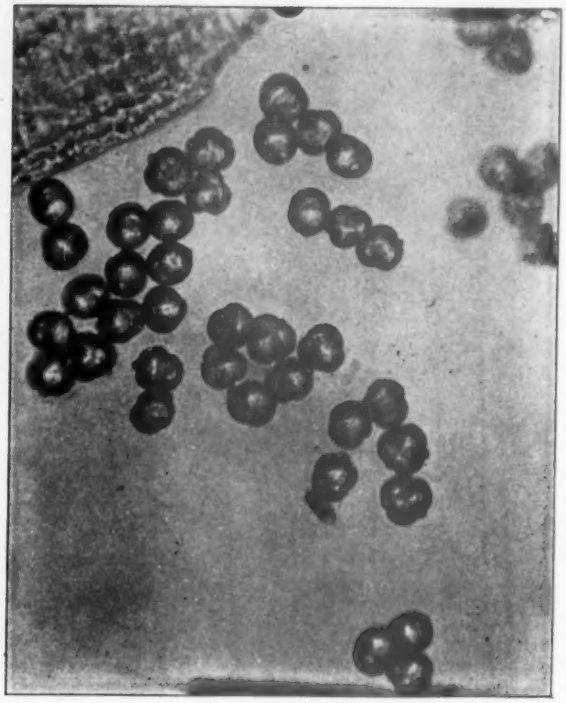

FIG. 17.—Pollen of Sagebrush (Artemisia tridentata). Magnified 350 diameters.

FIG. 18.—Atmospheric-pollen plate exposed at Austin, Texas, showing pollen of Mountain Cedar (Sabina sabinoida). Magnified 350 diameters.

NOTE. As the photomicrographs have different magnification, the effect is lost unless the scale is stated. This has been corrected to accord with the reduction in the cuts.

represent these four groups, it would still further simplify the application of pollen therapy.

The four groups into which we have divided the hay-fever pollens are the following: Ambrosiaceae, Gramineae, Artemisiae and Chenopodiaceae.

THE AMBROSIACEAE (RAG-WEED) GROUP.

An extended series of tests at our biological laboratory has shown that all the pollens of the Ambrosiaceae family have a marked resemblance both microscopically and in their hay-fever reactions. They vary only in size and they present the same reaction to the Lugol solution. While their hay-fever reaction vary somewhat in the different genera, their similarity in this is quite sufficient to enable us to classify them in a single group.

Principal among the Ambrosiaceae is the common rag-weed (Ambrosia elatior, Fig. 2) which is responsible for 85% of fall hay-fever in the Eastern and Southern States. It is spiculated and measures 15 microns in diameter. The giant rag-weed (Ambrosia trifida, Fig. 9), which replaces the common rag-weed in moist sections, and which, in the general appearance of the plant has not the slightest resemblance to the common rag-weed, has a pollen with the same hay-fever reaction and microscopically differing only in size (20 microns.) The Western rag-weed (Ambrosia psilostachya, Fig. 10) also has the same hay-fever reaction, and the pollen is similar except in its size (25 microns).

The Gaertneria, sometimes called "false rag-weed," also belongs to the Ambrosiaceae family. The pollen gives a hay-fever reaction similar to the common rag-weed, and the pollen resembles them so much (Fig. 11) that they are difficult to distinguish microscopically.

The marsh elder (Ivas) is also a genus of the Ambrosiaceae family, and gives a reaction similar to the rag-weeds, but less marked. The extract requires 20% more strength to produce a hay-fever reaction similar to that of the rag-weeds. The spicules also are less prominent but more numerous (Fig. 12). They equal the Ambrosias in the amount of pollen generated. The principal varieties in the Eastern and Southern States is the rough marsh elder (Iva ciliata), but this is not sufficiently common to be of great importance, except in certain moist localities. In the Pacific and Rocky Mountain States, however, we have found the small-flowered marsh elder (Iva ciliata) and burweed marsh elder (Iva xanthiifolia) important factors in hay-fever.

The cockle bur (Xanthium) also belongs to this family and resembles the other species in the microscopic appearance and biological reaction. The spicules, however, are even less prominent than in the Ivas and more numerous (Fig. 13). The reaction is also less marked, being about 70% of the strength of the rag-weed reactions.

This resemblance in the Ambrosiaceae family in their biological reaction is very important from a therapeutic standpoint. Our tests have shown that the large majority of persons susceptible to one member of the group is susceptible also to the other members, so that all of the Ambrosiaceae family can morphologically be classified into a single group. As these form the principal cause of fall hay-fever in the Eastern and Southern States, the practical application of this greatly simplifies the subject of pollen-therapy.

THE GRAMINEAE (GRASS) GROUP.

In the gramineae (grass) family we have also a similarity of reaction. As there are altogether nearly 5000 species of grasses, this is fortunate from the standpoint of pollen-therapy. In practically all the cases which we have tested, subjects sensitive to grass pollens are also sensitive to other members of the group. The pollens of all the grasses are relatively large (30 to 80 microns), spherical and are stained blue-black by Lugol solution on account of their high proportion of starch.

The varieties of grasses vary greatly in different localities, but their reaction varies only in degree. This includes also the cereals, such as corn, rye, wheat and oats. The pollens of these, however, are relatively large (corn, 80 microns, Fig. 14; wheat, Fig. 15, and rye, 40 microns) so that they are not responsible for hay-fever except within limited areas. The grasses with small pollen, such as Bermuda grass (Capriola dactylon), June grass (Poa annua, Fig. 1) are responsible for more cases than the grass with large pollen, such as foxtail grass (Chaetochloa glauca), bull grass (Paspalum dilatum), cockspur grass (Panicum crus galli, Fig. 16), etc., on account of their greater buoyancy, which enables them to traverse a large territory.

THE ARTEMISIA GROUP.

The wormwoods (Artemisiae) also bear a marked resemblance to one another in their microscopic appearance* and chemical and biological reactions. The three-lobed form is characteristic of all the Artemisiae which we have examined, viz.: mugwort (Artemisia heterophylla, Fig. 3), wormwood sage (Artemisia frigida), sagebrush (Artemisia tridentata, Fig. 17), absinth wormwood (Artemisia absinthium), dark-leaved mugwort (Artemisia ludoviciana), biennial wormwood (Artemisia biennis), California old man (Artemisia californica), Indian hair tonic (Artemisia dracunculoides), and bud-brush (Artemisia spinescens). The wormwoods (Artemisiae) are the most important hay-fever plants of the Pacific and Rocky Mountain States, and the hay-fever reaction of all the varieties which we have examined is marked, being ten times more active than that of the rag-weeds (Ambrosiae).

* The only exception is the *Artemisia biennis* which has spiculated pollens but otherwise is similar in appearance and reaction.

THE CHENOPODIACEAE GROUP.

Among the plants which rank next to the Ambrosiaceae, Artemisiae and Gramineae are the members of the amaranthaceae, chenopodiaceae and Rumex families, which are both numerous in their varieties and general in their geographical distribution, over 50 of each having been described, most of them being typical hay-fever weeds and wind-pollinated.

The members of the amaranthaceae, chenopodiaceae and rumex generate pollens which are smooth and spherical, and having a general resemblance to one another. They also have a similar reaction to the Lugol solution, indicating a low percentage of starch. All the varieties tested give a mild hay-fever reaction and, with few exceptions, persons susceptible to one species react also to other members of the group.

The chenopodiaceae are a large family which includes, in addition to the true chenopods, several other varieties, such as the orache (Atriplex), the grease-weeds (Sarcobatus) and saltwort (Salsola). They all give a similar mild hay-fever reaction.

The branch of the Amaranthaceae family which has several members of interest in hay-fever is the *Acnida* or water-hemp. Some of these, as the Western water-hemp (Acnida tamarascina), generate a large amount of pollen. Most of these are limited to swamps and moist land. The reaction is similar to that of the Amaranthus, Rumex and Chenopodium, which they also resemble in the general appearance of the pollen.

While the members of this group give a mild hay-fever reaction, they are sometimes of importance by causing hay-fever at seasons when the grasses (Gramineae), rag-weeds (Ambrosiae) and wormwoods (Artemisiae) are not pollinating.

The similarity of the Amaranths, Chenopodia, water-hemp and docks, both as regards the character of the hay-fever reaction and the individual susceptibility to these pollens, demonstrates a similarity in their toxic principle. The indications are, therefore, that a pollen extract of any of these pollens will be applicable to all the members of this group.

In addition to the members of these groups, there are local and special cases of hay-fever due to the pollen of plants not included in these. This is the case with the Western cottonwood (Populus sargentii), to which a number of persons are susceptible. Another is the pollen of the mountain cedar (Sabina sabinoida) found in certain parts of Texas. These pollens, for instance, bear no resemblance in their appearance, chemical or biologic reaction, or individual susceptibility. Such cases of hay-fever must, for the present, be given individual consideration.

The four groups which we have described, however, include most of the pollens that are responsible for hay-fever. As this investigation has been carefully conducted, we believe that it will not only simplify the subject of pollen-therapy, but also place it on a more scientific basis.

SUMMARY.

(1) The efficacy of pollen-therapy requires accuracy as regards the pollen to which the patient is sensitive.

(2) The test of a hay-fever subject should be directed to the pollens to which he is exposed.

(3) The atmospheric-pollen plates give definite information regarding atmospheric pollen in any locality, and should be used before testing the hay-fever reaction or applying pollen-therapy.

(4) While there are hundreds of varieties of hay-fever plants, carefully conducted tests have shown that the majority of these may morphologically be divided into four groups, the members of which are sufficiently alike in their chemical and biological reaction to warrant the same pollen-therapy.

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[2] Scheppegrell, William: "Hay-fever and Its Prevention." United States Public Health Reports, July, 1916.

SOME NOTES ON ARTIFICIAL PNEUMOTHORAX.*

BY PAUL H. RINGER, A.B., M.D., ASHEVILLE, N.C.

IN the course of this brief paper it is my purpose to avoid the stereotyped questions of indications for the induction of artificial pneumothorax and details of technic in its administration, and to devote my attention to stressing a few points that have impressed me in the course of four and a half years of constant use of the procedure.

Quantity of Gas to be Injected.

In the early days of my use of this method the temptation was almost irresistible, both at the first and at subsequent injections, to allow as much gas to flow in as the patient could tolerate; depending, as an indication for stopping the flow, upon marked positive manometric readings and upon the patient's statements of feeling "full" and dyspnoeic. Experience has shown the fallacy of this procedure. Now, more than 300 cc. are never injected at the first sitting (save when the gas is administered for stopping hemorrhage), no matter what the manometric readings may be, and at subsequent injections the gas is cut off when the water manometer shows a mean reading of zero, or, at most, plus 1 or 2 cm. This conservatism necessitates a few more injections per patient, but the displacement of the thoracic contents comes about far more gradually, and subjective and objective signs of discomfort and oppression are far less marked. Subcutaneous emphysema is also less frequent, and quiescent processes in the uncollapsed side are less apt to be awakened into renewed activity, as the strain is thrown more gradually upon the sound lung. Thus, from the standpoint of the patient's comfort, as well as from that of his welfare, I am convinced that conservatism with regard to the amount injected is most important.

These considerations must be disregarded when the gas is injected to compress the lung for the checking of profuse hemorrhage. Here an emergency is present and chances must be taken. I have injected as much as 1000 cc. at once to control bleeding. The brilliant results that I have obtained in bleeding cases have imbued me with great confidence in artificial pneumothorax as a hemostatic. The sudden strain thrown upon the opposite side is not necessarily damaging, for compression is to be maintained only for a length of time sufficient to permit of the formation of a firm clot at the site of bleeding—prompt and firm compression for from seven to fifteen days is necessary. Then no more gas is given and the compressed lung soon re-expands, for at that time absorption of gas is relatively rapid and pulmonary elasticity as yet unimpaired.

Pleural Effusions.

The question of the occurrence and management of pleural effusions on the compressed side is one that is the subject of much controversy. In my experience fluid has appeared in about 50% of the cases where collapse has been obtained. In some of these cases but an ounce or two of the fluid has been visible in the costophrenic sinus by means of the fluoroscope; in some the effusion has reached to the clavicle. At first sight it would seem that the appearance of fluid should be of benefit. The fluid does quite as well as the gas in holding the lung collapsed, its presence lessens the frequency of gas injections, and if there be enough, does away with them entirely. But the other side of the question must be considered. First, as regards the patient's comfort: many are greatly annoyed by the sloshing about of a quart or more of free fluid in the pleural cavity, the noise and mobilization of weight being noticed at every shifting of position. Some find the fluid very heavy, and so it often is—(in one case I removed six and one-half pounds of fluid from the right chest)—in left sided cases the weight of the fluid pressing upon the subjacent stomach causes distressing and intractable digestive disturbances. Second, as regards the patient's welfare: Were we sure that the fluid present

* Read before the Buncombe County Medical Society at Asheville, N. C., 1916.

would always remain wholly liquid and therefore be under control (*i. e.*, capable of removal at any time), the discomforts of the patient, if not too great, might be disregarded because of the obvious aid on the part of the fluid in maintaining a collapse. Unfortunately, the fluid remaining in the pleural cavity for many months not infrequently undergoes a change in consistency. It becomes thick and finally gelatinous. As soon as it has lost its limpidity we are, of course, powerless to remove it. Hence, the collapsed lung is beyond control. The gelatinous mass that sometimes results may, in time, become reabsorbed, but a great mass of thick, inelastic tissue between lung and parietal pleura remains, inhibiting the collapsed lung from any marked degree of expansion. Quite apart from the eventual desirability of allowing the collapsed lung to re-expand, it may at any moment become imperative to remove the compressing force because of renewed activity on the opposite side, and this necessity may arise even after the collapse has been maintained for over a year. In the presence of thick fluid or a gelatinous deposit, evacuation is impossible. Hence, I have made it a practice to remove promptly any considerable accumulation of fluid (by that I mean any amount reaching the 4th rib) and substituting gas for it either at the time the fluid is withdrawn or shortly afterwards. The fluid may re-collect in the pleural space. If this occurs, paracentesis is again performed. It may be necessary to tap even a third time. If after this, the fluid still re-collects, I keep the patient under weekly fluoroscopic examinations in order to demonstrate the limpidity of the fluid or to discover any signs of its becoming thickened, and tap from time to time, usually when the fluid reaches or over-tops the fourth rib.

Air Embolism.

The great danger at the initial injection of gas is that of air embolism. This occurrence is rare, but its great fatality makes it ever dreaded. In initial injections performed by myself in some fifty-five cases and witnessed in more than one hundred additional cases, I have not yet seen this phenomenon; despite this, I never approach a new case without the thought and dread of this occurrence. Air embolism may be brought about without any gas having been injected. When the needle is inserted, it may be pushed too far in and puncture the lung, tearing one of the vessels in the walls of the air alveoli, or going through the wall of a known or unsuspected cavity. Under such conditions, the laceration may be so situated that with each inspiration air from the lung is aspirated into the pulmonary vessels, air embolism resulting. This is by no means a fanciful theory, as deaths have been reported from air embolism and this mechanism of its causation demonstrated at necropsy. Avoidance, or at any rate lessening, of this danger can be brought about, first, by having the field of operation the highest point of the chest; thus, if the mid-axillary region be chosen, a pillow or sand bag placed beneath the patient in such a manner as to make the field of operation convex, will serve the purpose; second, by inserting the needle very slowly and steadily through the chest wall until it is thought that the pleura is reached, and by not inserting the needle at a greater depth than 3 or 4 cm., though in patients with very thick chest walls this latter rule must be disregarded. Saugmann, of Denmark, is very insistent upon not inserting the needle too deeply, and uses a needle with an adjustable washer, or shoulder, which he fixes at 3 cm. from the point, so convinced is he that the distance from skin to pleura is never more. I have not used this type of needle.

Gas Pockets.

It is often possible to obtain only small pockets of gas varying in size from 50 cc. to 200 cc. each. All authorities advise continuing injections in these cases in the hope that the limiting adhesions will give way, the pockets coalesce and a collapse be obtained. In accordance with these precepts I have kept patiently at work, but my results have been disappointing, and I feel very dubious about ever getting a really satisfactory collapse unless from the start gas flows in with comparative ease. Not infrequently, fine, fresh, exquisitely painful adhesions are encountered that yield easily. In such cases success may come. But in those cases where typical pockets form, failure has been my lot.

Partial Collapse.

A word must be said relative to partial collapse. While, of course, brilliant results are to be obtained only from total collapse, yet partial collapse must not be looked at askance, as it is often the means of prolonging life, relieving symptoms and rendering the patient infinitely more comfortable. In cases where partial collapse, alone, is obtainable, it usually happens that the walls of cavities are not closely coapted, and consequently secretion from these walls continues. Hence, symptoms of cough and expectoration will not wholly subside, a certain amount of absorption of toxic material will always take place, and gas injections in such cases must be indefinitely continued.

Duration of Collapse.

Duration of collapse in cases where a complete result has been obtained should be from eighteen to thirty-six months, preferably the latter. I am a great advocate of "let well enough alone," and when a case is wholly collapsed, the sound side standing the added strain well, no fluid present, and the patient practically free from symptoms, I am loath to advocate re-expansion under three years or more. We may *think* healing has taken place: we do not *know*.

Moreover, in the majority of cases when the pleural layers are again allowed to coapt, they adhere once and for all, the gas having acted in the nature of an irritant to the membrane, and further injections of gas are out of the question. This is not invariably the case, for Dr. James A. Miller, of New York, told me of two cases of his that had been allowed wholly to re-expand and with whom he had subsequently been able to resume gas. Such patients are, however, the exception.

A word or two as to the personal opinion of the writer on the question of artificial pneumothorax. I think I may characterize myself as a conservative enthusiast with regard to artificial pneumothorax, save in those cases where gas is administered for the control of hemorrhage, when I become an unreserved enthusiast. I know of no result in tuberculo-therapy more brilliant than the change wrought by the successful induction of pneumothorax. The return to health and the subsidence of symptoms are sometimes so rapid as to be almost uncanny. But again there is the other side of the picture. We see few bluer and more despondent patients than those upon whom pneumothorax has been tried without success. They feel that the last straw has snapped, and alas! in the vast majority of cases they are right. The method is usually tried on advanced cases or in those in whom there is going on a rapid dissemination from a relatively small primary focus. If collapse fails, we are left face to face with prolonged bed-rest, etc., all of which has probably already been resorted to before pneumothorax was attempted. Again, there are no sadder pictures than are presented by those unfortunates in whom pneumothorax has worked wonders and in whom those wonders fade away before our eyes with the awakening to activity of a previously quiescent focus in the good side. We take out the gas—the focus may quiet down—but the last condition is never as good as the first, and more often the patient goes steadily down hill. Judgment and more judgment is needed in the selection of cases. But few there are that will be wholly unilateral. Then the question presents itself, will the relatively sound lung hold? Some we know will not—that settles it—but the borderline case is hard indeed to decide. Experience, small injections and frequent and repeated stethoscopic examinations of the sound side are necessary to reach a satisfactory conclusion.

While the preceding paragraphs may sound skeptical and possibly pessimistic, it is not the intention of the writer to convey that impression, but merely to stress the point that, despite the wonders wrought in certain cases by the use of this method, the way is fraught with danger and many and many a time failure will be our lot. I do feel, however, that the induction of artificial pneumothorax in the treatment of pulmonary tuberculosis is a procedure that should be at the command of every man dealing largely in pulmonary affections. In an analysis of thirty cases of my own recently reported before the North Carolina Medical Society I was able to report success in 23 per cent. and adding thereto three successful injections for hemorrhage, a total of 33 per cent. was attained. Surely this is enough, and far less than this should be enough, to warrant the use of the method which is, as far as I know, the only procedure at our command by which we can offer, to a certain number of advanced cases, a one-in-three chance of a return to health and working efficiency.

In conclusion, I would express my thanks to my friend and colleague, Dr. Charles L. Minor, of Asheville, for his great kindness and courtesy in allowing me the free and constant use of his excellent fluoroscopic apparatus, enabling me thus to keep my patients under far better observation than I should otherwise have been able to do.

Clinical Department.

A CASE OF PERNICIOUS ANEMIA IN A SYPHILITIC TREATED WITH SALVARSAN.*

BY LAWSON G. LOWREY, A.M., M.D., BOSTON,

Assistant in Neuropathology, Harvard Medical School, Pathologist to Danvers State Hospital.

PERNICIOUS anemia as a cause of mental disturbance is uncommon, at least in this hospital, forming only a small fraction of a per cent. of the admissions. The psychosis is usually in the form of a depression.

This case is, therefore, unusual in the form of the psychosis. In addition, there was an interesting diagnostic problem, and finally, the man had been treated with salvarsan within a few months prior to the development of the anemia.

It is not my intention to present a study of the cerebral pathology as such; that is reserved for use in another connection.

Male, age 37, admitted to Danvers October 27, 1914. Born in Germany, 1877. Family history not remarkable. "Spinal trouble" as a baby. Operated for inguinal hernia, 1896. Otherwise well. Meagre education. Has worked as cooper, tinsmith and baker, which occupation he has pursued for some years. In his youth well liked, jovial, easy going. Intoxicated three or four times a year for many years, increasing of late.

At 20 a chancre, with treatment "for some time." For five years past treated for chronic nephritis. In July, 1913, went to the Massachusetts General Hospital complaining of feeling weak, headaches and abdominal distress. Wassermann reaction blood serum strongly positive. X-ray of abdomen

* A contribution to the William Leonard Worcester Series of Danvers State Hospital Papers, presented November 19, 1915.

gave a picture diagnosed as adhesions in right upper quadrant, involving stomach and hepatic flexure. In August and September he was given four doses of .3 gm. salvarsan. In October, condition good. In November, complained of cough. X-ray diagnosis, phthisis with calcification. Physical; lungs negative. In June, 1914, Wassermann reaction blood serum positive. June and July, 2 doses salvarsan.

For ten years migraine attacks, increased in severity and frequency of late. Married in 1906. No children. No miscarriages. For about four years very nervous, aggressive, irritable, violent temper. For three years unable to work steadily, and for 17 months, no work. Wife twice left him in this period because of his attitude toward her. For the past year practically always in a fighting mood. Twice arrested for fighting and drunkenness. Two weeks before commitment, secreted a knife under his bed clothing. About this time delusions became prominent. Thought he was dying. Wanted to become a Catholic so could claim his wife in the next world. Prayed much. One night said to his wife, who was lying quietly in bed, "Why are you dancing, and why is the house shaking?" Complained of white pigeons hanging over him.

The next night he became violent, leaped through the glass in a door and ran amuck on the streets in his night clothes, with a milk bottle as a weapon. Taken by the police to a general hospital, he was committed here three days later.

Here he was constantly restless, talkative and noisy; disoriented in all spheres; hallucinated and deluded. He had visual and auditory hallucinations. Thought he had been murdered, his body sawed in two in the median line. Then thought he was a Jewish rabbi in a Jewish church. Thought they were making a rocking-chair out of his body. Much of his conversation was incoherent. Afraid of being poisoned. Thought his eyes had come out of his body. Marked impairment of memory. Sense of choking.

Physical examination:—An emaciated man with yellow skin (not jaundice). Heart enlarged; all sounds feeble. A presystolic murmur at the apex transmitted upward. Liver dulness extended three fingers below costal border. Liver not felt. Spleen not enlarged. Penile scar. Pupils equal, react sluggishly to light and accommodation. Slight edema of feet. Knee jerks increased. Shuffling gait. Positive Romberg. Suggestion of Babinski. Stereognostic sense unimpaired. Tactile appreciation normal.

Wassermann on blood serum negative; spinal fluid negative; albumen normal; globulin negative; cells 3; gold 00000 00000. Blood examination; hemoglobin 40%; red cells 680,000; white cells 7600. Eosinophiles 0.6%; polynuclear 66.6%; mononuclear 32.6%. Normoblasts and macrocytes were observed. There was poikilocytosis and polychromatophilia. Hemoglobin 35%; red cells 500,000; white cells 6500.

As he failed he became quieter. Diagnosis, November 12, 1914: At first thought to be paresis, and some thought so even with the normal fluid. Others, psychosis associated with pernicious anemia.

Autopsy No. 1773—Two hours post-mortem. Summary of the autopsy findings: skin yellow; inguinal adenitis; pupils equal, dilated; fat, deep yellow; adhesive pleuritis, right and left; blood fluid, very light red color; hypertrophy and dilatation of heart; mitral stenosis; aortic valve fibrosis; "tiger lily" heart; active and healed (calcified) tuberculosis, both lungs; fatty kidneys, fibrosis; fatty liver.

Head:—Scalp not remarkable. Calvarium thickened in occipital region. Wide line of diploë. Dura thickened, silvery white, not adherent. The pia is very slightly thickened. Basal vessels not sclerotic. Brain wt. 1275 g. Pons and cerebellum, 160 g. Cerebellum firm. Floor of 4th ventricle smooth. Brain somewhat soft with "sticky" feel. Frontal atrophy. Brain very pale. Pia adherent.

With the exception of the slight changes in the pia, there is nothing in the gross brain findings to indicate paresis. Microscopic examination. Heart, kidneys, liver and adrenals show very marked fatty changes. There is a sub-acute tubular nephritis. The lungs show active and healed tuberculosis. A peribronchial lymph node also shows a cellular tubercle. Hypophysis, slight connective tissue increase in anterior lobe.

Nervous system: Ten areas of cortex, 2 of the cerebellum, 1 of the medulla and 3 of the cord show none of the classical findings of paresis. There is slight fibrous thickening of the leptomeninges. At one point between the cerebellar folia is a single small collection of round cells. Judging by the appearances in surrounding areas, these cells are migrated glia cells.

There are no degenerations by the Marchi and Weigert methods.

The most important diagnostic question involved here was whether or not the man was a paretic. Obviously, from the description, he was not.

However, there are other important points. Salvarsan has been used in the treatment of anemia, apparently without untoward effects. In this case pernicious anemia developed some time after treatment with salvarsan. Whether this relation is purely incidental is uncertain, although it probably is, in view of the large number of persons who have been treated with salvarsan.

Book Review.

Diseases of Children. A Manual for Students and Practitioners. By GEORGE M. TUTTLE, M.D., Clinical Professor of Pediatrics, Washington University Medical School, and PHELPS G. HURFORD, M.D., Pediatrician, St. Louis Lutheran Hospital. Third edition, thoroughly revised and enlarged. Illustrated with 47 engravings and 3 plates. Philadelphia and New York: Lea and Febiger. 1917.

This book, now in its third edition, is midway in size between the quizz compend and the ordinary text-book. It is necessarily superficial, but on the whole little objection can be taken to the contents. It is hard to see, however, why anyone should care to use this book when there are so many fuller and better text-books available. The only place we see for it is among the students of the Washington University Medical School, at which the authors are instructors.

THE BOSTON
Medical and Surgical Journal

Established in 1812

An independently owned Journal of Medicine and Surgery published weekly, under the direction of the Editors and an Advisory Committee, by the BOSTON MEDICAL AND SURGICAL JOURNAL SOCIETY, INC.

THURSDAY, JULY 12, 1917

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An editor will be in the editorial office daily, except Sunday, from twelve to one-thirty p. m.

Papers for publication, and all other communications for the Editorial Department, should be addressed to the Editor, 126 *Massachusetts Ave., Boston. Notices and other material for the editorial pages must be received not later than noon on the Saturday preceding the date of publication. Orders for reprints must be returned in writing to the printer with the galley proof of papers. The Journal will furnish one hundred reprints free to the author, upon his written request.*

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ERNEST GREGORY, *Manager,*

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VOLUNTEERS FOR THE MEDICAL CORPS.

IN times of war, when untold sacrifice is demanded of many people, and all people feel, through one means or another, the unrelenting imposition of unusual and necessary demands upon them, the medical profession, trained as it is to instant response to other men's needs, should find itself a leader in volunteering to patriotic service. In the matter of enlistment in the Medical Corps, however, this has not proved the case. The medical departments of the Government, organized for peace conditions, must enormously increase their capacity before they will be able to cope with the military situation brought about by the present war. Their function in the army is to do three things,—examine recruits, look after the hygiene of the camp and care for the wounded. To do these things adequately for the army soon to be in training will require from 10,000 to 12,000 physicians, and the number of men enrolled is far below this requirement. The surgeons-general have not as yet been given full authority and means whereby to enter upon their duties, and until the ranks of the departments are filled, the authority and means can be of little use. The service is recruited solely by volunteers, and with the President ready to confer authority and Congress ready to provide the means, there is lacking only the spirit of service among the profession.

It is to the younger physicians that the appeal is principally directed. Men who graduate at this time can enter the Medical Corps directly. Men who have graduated and have had one year's hospital training and are younger than 32 years of age, can enter the Medical Corps of the Army. For the Medical Reserve Corps or the new Officers' Reserve Corps, there is need of men who have graduated in the last five years, especially those who have had hospital experience. The older men of the profession can do much toward encouraging and stimulating the young men, more especially those not yet firmly anchored by family ties, promptly to enlist in the Reserve Corps; or if their education and training have been sufficiently broad, they may join the regular Army or Navy. It is unquestionably true that the advantages offered by the Medical Department of the Army and Navy, both for patriotic service and for rapid promotion, have not been before, and will not soon again, be paralleled.

In another column of this issue of the JOURNAL we publish further information issued by the United States War Department regarding appointment in the Medical Reserve Corps of the United States Army. We publish also the personnel of the examining boards for the Medical Reserve Corps in New England and New York. Physicians intending to join the Reserve Corps may obtain the necessary blanks by writing to the surgeon-general of the United States Army at Washington; and when the applications have been made out, should forward them to the nearest chairman of the examining boards, who will make appointment for the applicant to appear for the examination.

AMERICAN OCCUPATION OF BRITISH FIELD HOSPITALS.

AFTER being royally welcomed and entertained by the enthusiastic English, the American hospital units for foreign service crossed the Channel and quietly took possession of six of the British field hospitals in France, thereby releasing the British staffs for duty near their fronts. The hospitals have been located on carefully selected sites and have been developed and perfected to a high degree of efficiency in their three years of existence. Some of the hospitals are made up of tented wards, accommodating forty to sixty beds each; others are constructed of a series of huts, and operating theatres lack nothing in the way of modern surgical equipment. Originally planned for 1040 beds each, most of the hospitals can care for 1400 beds in an emergency, and some have accommodated 2000 patients in a crisis.

The first of the American units to reach France was known as United States Base Hospital No. 4, and was organized in Cleveland by Dr. George W. Crile, with Major Gilchrist of the United States Army as commanding officer. This unit has taken over British General Hospital No. 9, "somewhere in France." United States Base Hospital No. 5, organized at Harvard University by Dr. Harvey Cushing, with Major R. U. Patterson as commanding officer, has taken over British General Hospital No. 11; United States Base Hospital No. 2 from the Presbyterian Hospital, New York, organized by Dr. George Brewer, with Major Lucius P. Hopewood commanding, has taken over British General Hospital No. 1; United States Base Hospital No. 21, organized in St. Louis by Dr. Frederick Murphy, with Major James D. Fife commanding, has taken over British General Hospital No. 12; United States Base Hospital No. 10, organized in Philadelphia, largely in the University of Pennsylvania, by Dr. Richard Harte, with Major M. A. Delaney commanding, has taken over British General Hospital No. 16; United States Base Hospital No. 12, organized in Chicago by Dr. Frederick Besley, with Major C. C. Collins commanding, has taken over British General Hospital No. 18, all of course being "somewhere in France." To these may be added the Harvard Unit, which for over a year has been in charge of British General Hospital No. 22.

Each unit has an organizing director who was a surgeon in civil practice but now takes command as a major in the United States Reserve. The commanding officer in each unit is a regular American Army surgeon while the subordinate members of the staffs are made up of Regular Army surgeons and doctors commissioned from civil life. The nurses are all graduates from well-known training schools and the non-commissioned orderlies and privates were practically all taken from civil life. Each American hospital staff has also organized a mobile unit for service in the casualty clearing stations, just back of the firing lines, for emergency work during the first days of great battles.

WELCOME TO AMERICAN DOCTORS.

THE JOURNAL has received a letter from J. Y. W. MacAlister, secretary of the Royal Society of Medicine, inviting most cordially all American doctors who are passing through London to make use of the Society's rooms in Cavendish Square. This is in further expression of the hearty welcome which is waiting for American doctors who are crossing the ocean to help in the war. Dr. MacAlister's letter reads further as follows:

"During their stay on this side we offer them all the privileges of Fellowship gratuitously. We have the finest medical library in this country, and many comforts in the house which make it almost a Club, and nothing would please us better than to see it crowded with our American friends. I have communicated this to some of the leading doctors who have already arrived and gone to France."

Further invitation is extended to attend the meetings which are held for reading of papers, clinical demonstrations and for discussions.

A CANCER DECALOGUE.

IN another column of this issue of the JOURNAL (page 62) is published the "cancer decalogue," prepared by the standing committee on the control of cancer of the Massachusetts Medical Society. The attention of members of the Society and of all other physicians is directed to this important statement, whose publication in the JOURNAL will be repeated monthly, by request of the committee.

MEDICAL NOTES.

FOURTH OF JULY PREPAREDNESS.—In 1903, 415 persons in the United States developed lockjaw (tetanus) following Fourth of July pistol and firecracker wounds. In 1908 there were 76 such cases with 55 deaths, and last year, so far as we can learn, there was only one case of lockjaw due to this cause. Two factors have led to this gratifying decrease in this unnecessary loss of life, namely, safe and sane celebration of Independence Day, and the prompt use of tetanus antitoxin.

The antitoxin, while almost infallible as a preventive of lock-jaw, has had but little value, as ordinarily used, in fully developed cases. Inasmuch as the disease so often follows Fourth of July pistol and firecracker wounds, it is of the utmost importance to have tetanus antitoxin injected promptly after the injury.

The New York Department of Health has for some years supplied tetanus antitoxin free of charge, and on request will even send a trained physician to inject the remedy. Not a single case of lock-jaw has occurred in any of the cases promptly injected.

The attention of physician readers is again called to the treatment of developed cases of tetanus by means of spinal injections of tetanus antitoxin.

The prevalence of Fourth of July tetanus in the United States is shown in the following table:

1903	415 cases		
1904	105 cases		
1905	104 cases of which	87 died	
1906	89 cases of which	75 died,	10 in New York City
1907	73 cases of which	62 died,	5 in New York City
1908	76 cases of which	55 died,	6 in New York City
1909	150 cases of which	126 died,	7 in New York City
1910	72 cases of which	67 died,	4 in New York City
1911	18 cases of which	10 died,	3 in New York City
1912	7 cases of which	6 died,	2 in New York City
1913	4 cases of which	3 died,	2 in New York City
1914	6 cases of which	6 died,	3 in New York City
1915	4 cases of which	4 died,	3 in New York City
1916	1 case of which	1 died,	1 in New York City

PREVALENCE OF DISEASES IN THE UNITED STATES.—The weekly report of the United States Public Health Service for June 22, 1917, states that during the month of May there were forty-three cases of cerebro-spinal meningitis in Maryland, twenty-four in Wisconsin and twenty-four in Massachusetts. During the same period there were in Massachusetts nine cases of poliomyelitis, and seventy of typhoid fever. There were eighty-one cases of typhoid fever in Maryland and eighty-three in West Virginia. There were 158 cases of smallpox in Wisconsin.

The number of poliomyelitis cases in the United States reported thus far this year is exceptionally low. The total number reported in the entire country for the month of May was only nineteen. Massachusetts led with nine cases. During the first week in June there were six deaths, two in Massachusetts, three in New York and one in New Jersey. Three cases were reported from Ohio, three from New Jersey and one each from New Hampshire, Wisconsin and Missouri.

DECREASE IN MORTALITY FROM PELLAGRA IN 1916.—The experience of the Metropolitan Life Insurance Company, which has a large number of policy-holders in the section of the country where pellagra prevails, contains sidelights on the progress of this disease during recent years.

In recent years pellagra has very rapidly increased in importance as a cause of death. In 1911, the number of deaths in the company's experience was only 277; in 1915 this number had increased to 650. During this period the rate had increased from 3.6 per hundred thousand exposed persons, to 6.7. In 1916 the number of deaths dropped to 368, and the rate to 3.6 per 100,000, exactly the same as in 1911.

The insurance company's statistics make possible a number of interesting deductions with reference to the characteristics of this disease. The very remarkable drop in the rate in 1916 appears to bear out the tentative conclusions of the Government experts who are now studying pellagra, namely, that the disease is not of infectious origin but is probably one of the so-called "deficiency" diseases induced by insufficient, poorly balanced dietaries. The year 1914 and the first half of 1915 were periods of depression in the cotton belt and this was reflected by higher pellagra rates. In the latter part of 1915, and in all of 1916, prosperity prevailed, and the industrial and agricultural communities of the South enjoyed a more abundant and varied ration. Future observation and experiment by Government authorities will probably definitely determine whether this explanation of the declining death rate of the disease is entirely satisfactory.

The disease is much more prevalent among the colored people than among the whites, and is much more frequent among females than among males. Thus, in the five-year period, 1911-1915, the rate among colored females was highest, 20.3 per 100,000; among the colored males it was 6.4; among the white females, 4.2; and among white males, the least of all, 1.7 per 100,000. It would be very interesting to learn why females in this country have, approximately, three times the pellagra mortality rate of males. Another interesting fact is that the incidence of the disease increases with age. There is no exception to this fact up to age 65. After 65, the rate remains fairly stationary.

Early reports for 1916 which have come from the health authorities of certain of the Southern states are in general agreement with the encouraging insurance figures referred to above. There is in effect good indication that the measures instituted by the U. S. Public Health Service, and the hypothesis upon which their work has been planned, are sound, and we may confidently expect that this comparatively new scourge will soon be under control.

WAR NOTES.

PREVENTION OF TUBERCULOSIS IN THE ARMY.—It is announced that Col. George E. Bushnell, commandant of the General Hospital, Fort Bayard, N. M., which is the government hospital for the care of tuberculous soldiers, has been ordered to Washington to institute measures designed to safeguard American troops against

contracting tuberculosis. Colonel Bushnell was born in Massachusetts in 1853, graduated from Yale in 1876 and Yale Medical School in 1880. He served through the Spanish War as a major chief surgeon and received his commission as colonel in 1911.

EMERGENCY HOSPITALS.—President Wilson has sent to Congress a recommendation by Secretary Daniels for an appropriation of $2,200,000 to be used in building emergency hospitals. Temporary hospitals are nearing completion at Portsmouth, N. H., Philadelphia, Newport, Norfolk, Charleston, Pensacola and New Orleans and plans have been made for the erection of similar hospitals at New York, Annapolis, Jamestown, Quantico, Va., Key West, the Great Lakes, Mare Island and Puget Sound.

A DRAFT FOR ARMY DOCTORS.—The New York Committee for National Defense, in a report to the central council at Washington, has urged a system of drafting doctors for the medical corps of the Army. The failure to obtain, through volunteering, anywhere near the necessary number of surgeons, has resulted in an effort on the part of the Committee to urge a selective draft of all available physicians. The Committee states that of the 140,000 doctors in the United States, less than one-half are available and desirable for military purposes, and that the policy of allotting or urging physicians to volunteer indiscriminately in the great numbers needed as medical officers for the war, is sure to result in confusion, waste and failure. The draft, based upon special classification by census, would accomplish the desired result by bringing into the army those best fitted for its uses and by leaving at home the physicians needed by the community.

RE-EDUCATION OF CRIPPLED SOLDIERS.—A conference of ten representative physicians has laid before the Council of National Defense recommendations for the establishment of a system of re-education and rehabilitation for men who may be maimed or crippled in the war. The physicians who framed the report are Drs. James Bordley, Jr., Baltimore (ophthalmology); John Staige Davis, Baltimore (plastic surgery); C. R. Dooley, Pittsburgh (vocational education); S. I. Franz, Washington (neurophysiology); F. B. Gilbreth, Providence (management engineer); R. W. Lovett, Boston (orthopedic surgery); Harris P. Mosher, Boston (otology); T. H. Weisenburg, Philadelphia (neurology); W. A. White, Washington (psychiatry), and Edwin W. Ryerson, Chicago (orthopedic surgery).

A study of the situation has shown that of the whole number of maimed men, at least 80 per cent. can be trained to new occupations if their physical defects receive immediate treatment after they have left the army hospitals and their training is given proper attention. From 70 to 80 per cent. of the wounded returned to Canada have needed reconstruction work. The conference recommends that a permanent commission be formed to lay plans for the proper organization of the work.

STANDARDIZATION OF MILITARY MEDICAL SUPPLIES.—The Council of National Defense has compiled a set of catalogues of staple medical and surgical supplies selected to meet war conditions and listed for the purpose of standardizing such supplies. In the opinion of the Committee it is highly desirable that wide publicity be given its work with regard to this standardization. The first catalogue issued under its supervision is Part I, covering surgical instruments, and this will be mailed gratis to all interested physicians and surgeons upon application to Major F. F. Simpson, M.O.R.C., Chief, of Medical Section, Council of National Defense, Washington, D. C. Other catalogues in preparation are:

1. Medicines, Disinfectants, Anaesthetics, Chemicals, etc.
2. Hospital Equipment and Supplies.
3. Laboratory Apparatus.
4. X-Ray Apparatus.
5. Dental Instruments and Supplies.

Such a standardization of supplies will result, it is expected, in insuring for the needs of the medical services of the Army and Navy, the Red Cross and civilian hospitals sufficient amounts of these supplies even under the abnormal conditions of war. The committee is assured, by thus selecting a minimum number of staple and essential articles, the maximum and economical production of such articles. It has been agreed by the manufacturers that their production shall be given precedence over other articles for similar purposes.

ASSISTANCE FOR TUBERCULOSIS IN FRANCE.—Dr. Livingston Farrand, president of the University of Colorado, and director of the mission to be sent by the Rockefeller Foundation to render aid in the control of tuberculosis in France, makes the following statement regarding the prevalence of the disease in that stricken country:

"The French death rate from tuberculosis is, roughly, twice that of America and three times that of England. Normally France has a high death rate and a low birth rate, and with the increase in tuberculosis brought about by the war it is evident that something must be done and without delay.

"It is estimated, say the reports to the Rockefeller Foundation, that in the three years of the war 150,000 soldiers have been discharged from the French Army because of active tuberculosis. Nor is this condition confined to the army. Refugees from the occupied districts of Northern France are breaking down in large numbers

and the French prisoners returned from Germany indicate a high percentage in that group.

"Since the war began, a special commission has been created to care for tuberculous soldiers. This work is of the greatest importance and must go on. It is doubtful, however, if at the end of this year there will be more than 10,000 or 12,000 beds available for tuberculous patients in the whole of France, and these will be occupied almost exclusively by soldiers.

"A conservative estimate would indicate that there are 500,000 cases of tuberculosis in the country. It is obvious that, whatever preventive measures can be laid down and followed out in the future, an immediate need is for hospital accommodations, and there is no more pathetic appeal to which the wealthy people of America could respond."

AMERICAN HOSPITALS IN ENGLAND.—The American Women's War Relief Fund, whose president is Lady Paget, has made arrangements that its two hospitals, one at Lancaster Gate, London, and the other at Paignton, be used for the care of American soldiers. Although established for the care of the British soldiers, with the entry of America in the war these American women in England wish these hospitals to be always open for such Americans as may need their services.

"Lady Paget has been foremost in her charity work since the outbreak of hostilities. She has gathered from America 3,500,000 socks and these, with tens of thousands of garments such as underwear, pajamas and shirts, have been sent to British fighting men in need of them. Lady Paget, personally, has raised in America and England $1,250,000 for British wounded, $175,000 for Russian wounded, $160,000 for French wounded and $125,000 for American hospitals in England.

Others associated with her in the American Women's War Relief Fund are Mrs. John Astor, vice-president, the Duchess of Marlborough, chairman, and Lady Lowther and Mrs. Harcourt, who are secretaries. The nine American women who make up the executive committee are headed by the wife of the American ambassador, Mrs. Page. Lady Randolph Churchill is chairman of the hospital committee, while the chairman of the economic committee is the Duchess of Marlborough."

HOSPITAL UNITS FOR NERVOUS AND MENTAL DISORDERS.—The National Committee for Mental Hygiene has created a subcommittee on furnishing hospital units for nervous and mental disorders to the United States Government, the project having been approved by Surgeon General W. C. Gorgas of the U. S. Army.

This subcommittee, of which Dr. Pearce Bailey of New York is chairman, is authorized to secure the services of alienists and neurologists to be commissioned in the Officers' Reserve Corps, Medical Section, and to serve in the neuro-psychiatric units which are to be attached to the base and other hospitals of the military services of the United States. Further information will be given, and application forms sent to physicians qualified in this branch of medicine, on application by letter or in person to The National Committee for Mental Hygiene, 50 Union Square, New York City.

DEARTH OF BRITISH MEDICAL OFFICERS.—In the issue of the *Lancet* for June 2 appears the following paragraph relative to the dearth in the supply of medical officers for the British Army and the expectations entertained for the making up of this deficiency by American physicians.

"The Central American War Committee has been working steadily and at great pressure to meet the demands of the War Office for medical officers for the Army, and the position indicated in these columns some time ago as imminent has clearly been reached. In existing circumstances all the War Office demands cannot be met. The information that a large number of American medical men will shortly be available for service in France has been considered by many to promise an amelioration of the situation, but there is as yet no definite and official warrant for believing that the problem of an adequate supply of medical officers for the British Army will be solved in this way. Undoubtedly there are American medical men promptly available to serve for the time being with our Army or with the French Army, and probably more of the same gallant assistance will be forthcoming. Recognition of the qualifications of these American confrères by their Medical Association or statutory Colleges would enable them to be at once available for the armies at the Allied fronts. But these American doctors would probably have to be returned to the American Army when expeditionary forces begin to arrive from the United States. A temporary respite from acute trouble, however, might be gained through the employment of American doctors, and such respite would be valuable to this country where the supply of medical men has become so dangerously short. The subject is now under the discussion of the Central Medical War Committee. No one who is aware of the circumstances in which exemption is refused or obtained by our medical men of military condition can possibly suggest that the Central Medical War Committee takes other than a very high view of its responsibilities towards the Army. It has, however, an enormously important duty towards the civilian population in this country, and cannot be blind to it. So closely have the areas in England been scrutinized with a view to obtaining every medical officer for the Army, so intensive is the method of investigation and reinvestigation now being conducted, that it seems certain that should all this energy and self-sacrifice not bear sufficient fruit, the Army will have to economise

in the employment of medical men under some plan of redistribution or reorganization. There are already men being sent into the Army who can badly be spared by the State."

Women's Medical Unit.—The first unit of women physicians for foreign service has been organized. Dr. Florence N. Ward, a surgeon of San Francisco, is chairman of the organization and Dr. Cornelia C. Brant, dean of New York Medical College and Hospital for Women, is treasurer. The unit includes women surgeons from all parts of the United States.

War Relief Funds.—On July 7, the totals of the two principal New England war relief funds reached the following amounts:

French Wounded Fund	$235,898.43
Surgical Dressings Fund	103,713.47

BOSTON AND MASSACHUSETTS.

Week's Death Rate in Boston.—During the week ending June 30, 1917, the number of deaths reported was 242, against 214 for the same period last year, with a rate of 16.34, against 14.86 last year. There were 37 deaths under one year of age, against 37 last year, and 66 deaths over 60 years of age, against 62 last year.

The number of cases of principal reportable diseases were: diphtheria, 65; scarlet fever, 32; measles, 183; whooping cough, 12; tuberculosis, 137.

Included in the above were the following cases of non-residents: diphtheria, 8; scarlet fever, 8; measles, 3; tuberculosis, 8.

Total deaths from these diseases were: diphtheria, 8; scarlet fever, 2; measles, 8; tuberculosis, 22.

Included in the above were the following deaths of non-residents: diphtheria, 1; scarlet fever, 1; tuberculosis, 1.

Long Island Hospital Graduation of Nurses.—On June 28, the training school of the Long Island Hospital graduated seventeen nurses. Chairman Thomas A. McQuade of the institution trustees administered the Florence Nightingale oath to the graduates, and Mrs. William McNamara of the National Civic Federation spoke on "Opportunities in Industry for Graduate Nurses."

Infantile Paralysis Fund.—The fund of the Harvard Infantile Paralysis Commission has now reached a total of $13,919.95.

Dedication of Winchester Hospital.—The newly erected Winchester (Mass.) Hospital, the cost of which was raised by popular subscription, was dedicated on June 28 in the presence of more than one hundred and fifty people. The building contains sixty beds, eight private rooms and two sun rooms.

Massachusetts Health Department and Alcohol.—The recently issued May number of the Public Health Bulletin of the Massachusetts State Department of Health gives the following notice to the subject of alcohol.

Recently Dr. Haven Emerson, Commissioner of Health of the city of New York, has twice come to Boston, first to address a meeting called by the alcohol committee of the Associated Charities, and later, a group of doctors and their wives, in regard to the effects of alcoholic drink on the health of the community. The information given by Dr. Emerson and the opinions expressed by the doctors present as to the part played by alcohol as a cause of sickness and death seem to demand that the Departments of Health should give out such information on the subject as they possess, especially the results of the more recent scientific inquiries.

Health departments are not called on to discuss the use of alcohol from a moral or religious point of view, but in so far as it affects the health of individuals and of society at large, the community has a right to expect the doctors and the health departments to give the facts, together with sound and reliable opinions; to tell the truth, the whole truth and nothing but the truth.

It is quite as important that the public should be correctly informed as to the effects of alcohol as it is that they should know the facts about tuberculosis and syphilis.

The amount of alcohol in patent medicines should be generally known.

We know now that alcohol is not a stimulant, but is a depressant; that its excessive use frequently causes insanity; that used even in moderation it more or less impairs the nervous system so that impressions are less clear and actions less accurate, thus causing innumerable accidents to the individuals and other innocent persons.

Alcohol causes damage to the heart, kidneys and blood vessels, as well as to the stomach and liver. Owing to its effect on the germ plasma it often damages the unborn babe. It reduces the resistance to bacterial infection, thus rendering individuals more susceptible to tuberculosis and other infections. Regular drinkers have a decidedly smaller chance of recovering from pneumonia. These subjects may be taken up more in detail in later numbers of the Bulletin.

The more we know about disease the more clearly we see that preventive medicine is most important for human welfare; for suppose a part of the body has been impaired or destroyed by syphilis or alcohol,—such destruction might have been prevented, but usually cannot be repaired.

NEW ENGLAND NOTES.

FUND FOR CONCORD (N. H.) HOSPITAL.—By the will of the late Dr. Ferdinand A. Stillings of Concord, N. H., the Margaret Pillsbury Hospital of that city is to receive a fund, the income of which is to be used for the purchase of surgical instruments. Dr. Stillings' own instruments were given to the Woman's Memorial Hospital.

INFANTILE PARALYSIS IN VERMONT.—On June 29 the total number of cases reported in Vermont had reached twenty-four. All but one are in Washington County.

The Massachusetts Medical Society.

NOTES FROM THE DISTRICT SOCIETIES.

ESSEX SOUTH.—The Executive Committee of the Essex South Medical Society at the annual meeting of the Society, May 9, 1917, was authorized to outline a course of action for the Society to follow that would aid those of our number about to enter the Government Service and that would tend to conserve their practice.

The Committee, after carefully considering the question, desires to submit the following recommendations:

1. One-half of the entire amount collected from the practice of an absentee, with the exception of lodge work, shall be paid to some designated person, preferably a bank official, for distribution to the absentee's family. Whoever serves as treasurer shall keep an accurate record of all money received and an accurate list of those from whom the money comes. The treasurer may also collect to advantage all unpaid accounts. The secretary of the Society shall have access to the lists at all times.

2. Every physician should agree not to visit professionally any of absentee's patients for at least six months after his return, without his knowledge and consent.

3. Each city in the district should take action on the question and decide how best the local situation can be met. The Committee feel that all physicians, irrespective of society affiliations, should take part in any action taken. A committee will be asked in each city to bring the physicians together.

4. Any agreement made should be signed by all the physicians in each city. A copy of the agreement should be in every office and the local papers should print the agreement with the signers.

The Committee realize that the suggested arrangement can apply only to those in general practice. It is suggested that those doing special work make an agreement among themselves. In case of doubt as to whom the patient belongs, the absentee should be given the benefit of the doubt.

DR. J. A. SHATSWELL, *Chairman*,
DR. D. J. FINNEGAN,
DR. J. F. DONALDSON,
DR. P. P. JOHNSON,
DR. H. P. BENNETT.

Obituaries.

COLONEL GEORGE D. DESHON.

COL. GEORGE D. DESHON, chief medical officer on the staff of General Clarence R. Edwards, commander of the Department of the Northeast, died suddenly at his home in Brookline, Mass., on June 24. Col. Deshon, whose record for service during the Philippine and Cuban campaigns had established, in military circles, his reputation for a brilliant officer, was asked by General Pershing to take command of his medical staff in France, which position he was obliged to refuse because of ill health.

Col. Deshon was born in Brookline, August 5, 1864, and attended Dartmouth College. From there he entered West Point and, upon the completion of his course there, was appointed to the same regiment with General Edwards, the 23d Infantry, at Fort Wayne, Ind. Shortly after his marriage he resigned in 1890, and studied medicine at Bellevue Medical College and the University of Pennsylvania. He then re-entered the army as a surgeon and was given the rank of Major. He was sent to the Philippines and achieved distinction. On his return he was appointed commandant of the Army and Navy General Hospital at Hot Springs, Ark. Subsequently he served in different capacities until appointed superintendent of the Ancon U. S. Canal Hospital at Panama. Under his supervision, the eleven army canal posts were brought to as high a mark as any in the government. Upon the transfer of General Edwards to the new northeastern department, Col. Deshon was chosen to accompany him. On arriving at Boston, Col. Deshon was not well, and for about two weeks was at the Massachusetts General Hospital. He did not, however, fully recover his health before he was stricken with death.

Colonel Deshon was a member of the Army and Navy Club, Washington; the Psi Upsilon fraternity, the Society of Colonial Wars in the Commonwealth of Massachusetts, the Massachusetts Society of the War of 1812, Massachusetts Society of the Military and Naval Order of the Spanish War, Massachusetts Society of Sons of

the American Revolution and the Society of the Army of the Philippines.

He is survived by a widow and a son, Captain Deshon of the field artillery, who is at the present time on sick leave in California. Of Colonel Deshon, General Edwards said:

"He was a loyal and devoted friend, and the ideal soldier-doctor. I do not believe there was a man of higher character in the United States service than he. Although the strictest kind of a disciplinarian, he was the sort of man that men loved and honored. The loss to the service will be serious."

HERBERT MAXON KING, M.D.

DR. HERBERT MAXON KING, who for many years had been physician-in-chief at the Loomis Sanatorium, died there from tuberculosis on June 24. Dr. King was born in Adams, N. Y., on August 11, 1864. He was educated at Dartmouth College and entered the University of the City of New York as a medical student, receiving his degree of M.D. in 1886. After practising for four years in New York, he entered the Marine Hospital service. This he left in two years to go to Grand Rapids, Mich. He soon achieved distinction in his profession, and became a recognized authority in the diagnosis and treatment of all forms of respiratory disorders. In 1897 he visted Paris for the purpose of studying the methods of the French, and upon his return resumed practice in Grand Rapids. In 1902 he was chosen to the position at the Loomis Sanatorium, which he held until his death.

JOHN WILLIAM WATSON, M.D.

DR. JOHN WILLIAM WATSON, who died at the Deaconess Hospital, Brookline, Mass., of toxemia, following an operation for appendicitis, was born at Lawrence, Mass., July 8, 1870. His college preparatory course was at Phillips Exeter Academy, and he was graduated from Dartmouth College in 1893, and from the College of Physicians and Surgeons at Baltimore, Md., in 1900. He had an A.M. from Dartmouth through post-graduate work. He practised his profession at West Hartford, Vt., at Beverly, Mass., and at South Braintree, Mass. At the time of his death he was a member of the officers of instruction of the Tufts College Medical and Dental Schools and Assistant to the Medical Examiner of the Suffolk South District. He was a Fellow of the American Medical Association and of the Massachusetts Medical Society. He is survived by his widow, his foster daughter, his mother and one sister and a brother.

Miscellany.

TUBERCULOSIS AND ITS RELATION TO THE MOTHER'S AID LAW IN MASSACHUSETTS.*

THE Mother's Aid Law in Massachusetts went into effect September 1, 1913. By this law the State, through the State Board of Charity, pays a sum towards the support of children under 14 years of age in dependent families in which the father is dead or incapacitated.

During the first three years of the Mother's Aid Law,—September 1, 1913, to September 1, 1916,—a total of 5052 cases were aided. In 3663 cases, or 73%, the husbands had died, and in 1389, or 27%, the husbands were living, but incapacitated for various reasons.

Two studies have been made of those cases dependent because of the *death* of the husband. The first, a study of 300 cases, shows that 92 husbands died of tuberculosis. The second, a study of 500 cases, shows that 126 husbands died of tuberculosis. This means that 27% of the husbands in these 800 cases died of tuberculosis.

The above studies indicate the percentage aided because the husbands had *died* of tuberculosis. There are also many *living husbands* of women receiving Mother's Aid who are tubercular, cared for in sanatoria or at home under supervision of local boards of health. Of the total of 5052 cases there were 266 of the husbands living but unable to support their families because of tuberculosis.

If 27% of the 800 cases studied is the correct proportion of *deaths* from tuberculosis, for the entire 3663 cases, we find the total number of such deaths to be 989, and adding the 266 cases of tuberculosis among the *living* but incapacitated husbands, we have a total of 1255 cases receiving Mother's Aid because of tuberculosis, or 25% of all the 5052 cases.

According to the estimate made by a state official, the total cost to cities, towns and state of the 5052 cases for the three years has been not less than $1,500,000. The proportion of this amount spent because of tuberculosis is, therefore, in the neighborhood of $375,000.

Besides the tubercular husbands, deceased or incapacitated by reason of tuberculosis, many of the mothers of these families are pre-tubercular or arrested cases of tuberculosis, and many of the children of these families are tubercular.

The problem of tuberculosis, as seen by those who administer the Mother's Aid Law, includes, therefore, the large number of husbands who died in the prime of life, leaving dependent families to be supported out of public funds; a

* Statement based on a paper read by Mrs. Elizabeth F. Moloney, Supervisor, Mother's Aid, Massachusetts State Board of Charity, at the Massachusetts State Conference of Charities, Lowell, Mass., October 27, 1916.

large number of tubercular husbands cared for at public expense in sanatoria or at home through the overseers of the poor and boards of health, and many of whose families must be aided by public funds; and many women and children who are incapacitated for work, and therefore have to be supported by public funds.

CANCER DECALOGUE PREPARED BY THE STANDING COMMITTEE ON THE CONTROL OF CANCER OF THE MASSACHUSETTS MEDICAL SOCIETY.

1. The classical signs of cancer are the signs of its incurable stages. Do not wait for the classical signs.

2. Early cancer causes no pain. Its symptoms are not distinctive, but should arouse suspicion. Confirm or overthrow this suspicion immediately by a thorough examination and, if necessary, by operation. The advice "Do not trouble that lump unless it troubles you," has cost countless lives.

3. There is no sharp line between the benign and the malignant. Many benign new growths become malignant and should, therefore, be removed without delay. All specimens should be examined microscopically to confirm the clinical diagnosis.

4. Precancerous stage. Chronic irritation is a source of cancer. The site and the cause of any chronic irritation should be removed. All erosions, ulcerations, and indurations of a chronic character should be *excised*. They are likely to become cancer.

5. Early cancer is usually curable by radical operation. The early operation is the effective one. Do not perform less radical operations on favorable cases than you do on unfavorable ones. The chances for a permanent cure are proportionate to the extent of the first operation. Make wide dissections; incision into cancer tissue in the wound defeats the object of the operation and leads to certain local recurrence.

6. Late cancer is incurable, though not always unrelievable. Radium, x-rays, ligation, cautery, or palliative operations may change distress to comfort and may even prolong life.

7. Cancer of the breast. All chronic lumps in the breast should be removed without delay. Benign tumors can be removed without mutilation. Examine all specimens microscopically. An *immediate* microscopical examination is desirable since, if positive, it permits a radical operation at the same sitting. A radical operation performed ten days after an exploration is almost never successful in curing cancer of the breast.

8. Cancer of the uterus. Any irregular flowing demands thorough investigation. Offensive or even very slight serous flows are especially suspicious. Curette and examine microscopically. Amputate all eroded cervices which do not yield promptly to treatment. Do not wait for a positive diagnosis.

9. Cancer of the digestive system is difficult of early diagnosis, and therefore unfavorable in prognosis. All persistent and recurring indigestions (more especially if attended by change of color and loss of weight) and any bleeding or offensive discharges demand prompt and thorough investigation. Do no wait for a positive diagnosis.

10. Cancer of the skin. Any warts, moles, or birthmarks which enlarge, change color, or become irritated should be removed promptly. They are likely to become cancer. Do not wait for a positive diagnosis.

INFORMATION REGARDING APPOINTMENT IN THE MEDICAL RESERVE CORPS OF THE UNITED STATES ARMY.

APPLICANT must be a citizen of the United States, between 22 and 55 years of age; a graduate of a reputable medical school; must have qualified to practise medicine in some state; and must be in the active practice of his profession. "Active practice" includes those who specialize in eye, ear, nose and throat, dermatology, neurology, obstetrics, etc.

The Act June 3, 1916, creating the Medical Officers' Reserve Corps, provides that in time of peace only those of the grade of first lieutenant may be ordered to active duty, and this with their own consent, but in time of war the services of officers of all grades are at the disposal of the government.

PROCEDURE.

(*a*) Fill out personal application blank; write distinctly.

(*b*) Certify to the application before a notary public or other person authorized to administer oaths. This is essential.

(*c*) Secure letters of recommendation from two prominent citizens who know you; these may be from physicians. Attach these letters to the application.

(*d*) Write to the examining board most convenient to you and arrange to present yourself for examination at such time as may be mutually agreeable. Do this as soon as possible.

(*e*) When you report to the board for examination, present to it your application blank, properly filled out and certified to as indicated above, your testimonials, your state certificate

and, if of foreign birth, documentary evidence of your full citizenship.

EXAMINATION.

The examination is physical and professional. The minimum physical requirements are: (*a*) height, 5 feet, 4 inches; (*b*) weight, 120 pounds; (*c*) vision, 20/100 each eye entirely corrected by glasses—no organic disease.

The professional examination for the Reserve Corps is not severe; it is oral and practical in character, and in case of failure is supplemented by a written examination.

MEDICAL CORPS.

A physician may be commissioned in the Medical Corps of the Army, provided he is between 22 and 32 years af age (34 up to Jan. 1, 1918), a citizen of the United States and a graduate of a reputable medical college legally authorized to confer the degree of Doctor of Medicine. He must have had also at least one year's hospital training subsequent to graduation, including practical experience in the practice of medicine, surgery, and obstetrics, and will be expected to present evidence to that effect. Whether or not he is married has no effect on his eligibility to the Medical Corps. He must pass a preliminary examination and a final or qualifying examination in accordance with the rules and regulations, which may be obtained on application.

EXAMINING BOARDS FOR MEDICAL RESERVE CORPS.

The following is a list of medical boards as appointed up to June 5. The name and address of the chairman of the board only is given. It is presumed that applicants will select the board most accessible to themselves, even though this may mean a board in another state:

Connecticut: New Haven, Lieut. John W. Churchman, M.R.C.

Maine: Brunswick, Lieut. F. N. Whittier, M.R.C., Bowdoin College; Ft. Williams, the Surgeon; Portland, Dr. William L. Cousins, 231 Woodford Street.

Massachusetts: Boston, Major Horace D. Arnold, M.R.C., Harvard University Graduate School of Medicine (President); Ft. Banks, the Surgeon; Springfield, Lieut. Charles F. Lynch, M.R.C., 387 Main Street.

New Hampshire: Hanover, Capt. Percy Bartlett, M.R.C.; Manchester, Capt. J. Franklin Robinson, M.R.C.; Nashua, Lieut. A. W. Shea, M.R.C.

New York: Albany, Major Henry L. M. Shaw, M.R.C., 361 State Street, President; Buffalo, Capt. Herbert A. Smith, M.R.C., 566 Delaware Avenue; Plattsburg, the Surgeon; New York, Major Henry C. Coe, M.R.C., Academy of Medicine, 17 W. 43d Street, President (office hours, 3 to 5 p.m. every day except Saturday and Sunday); New York, Dr. Simon Flexner, 150 E. 61st Street; Rochester, Major John M. Swan, M.R.C., 457 Park Avenue; Syracuse, First Lieut. Brewster Donst, M.R.C., 641 Park Avenue.

Rhode Island: Newport, Lieut. Charles D. Easton, M.R.C., 36 Ayrault Street; Pawtucket, Capt. James L. Wheaton, 210 Main street; Providence, Major John W. Keefe, 262 Blackstone Building.

Vermont: Ft. Ethan Allen, the Surgeon.

THE AMERICAN MEDICAL UNITS.

IN the issue of the *British Medical Journal* for May 26, 1917, appears the following account of the reception of the early medical units of the United States Army upon their arrival in England:

"The first element of the United States army to arrive in Europe is a medical unit, which reached a British port last week, and will leave for the war zone very shortly. The unit consists of 23 medical men, in addition to the major and adjutant, both of whom belonged previously to the United States regular army; 65 trained nurses, and 155 orderlies, as well as four lady stenographers and others serving in subsidiary capacities, including a drum and bugle corps. It was organized for Red Cross work by Dr. George W. Crile, professor of clinical surgery at the Western Reserve University, Cleveland (who has already gone to France), and it has been placed under the command of Major Henry L. Gilchrist, chief surgeon of the 11th Division (22,000 troops) of the United States Army. Major Gilchrist was serving on the Mexican border at the beginning of May, and was relieved in order to assume this new command. The order to go to Europe was received on May 3, and by May 6, 288 men had been examined and the 155 orderlies selected from this number and sworn in. During the same period, the organization, which had originally been voluntary, was made a part of the regular army; every officer, nurse, and orderly has signed on for three years in the regulars and four years in the reserve. All the medical men in the unit, apart from Major Gilchrist and Captain Tuttle, the adjutant, are connected with the Western Reserve University, and in addition to Dr. Crile, they include Major Hoover, professor of medicine; Captain Karsen, professor of bacteriology; and Major Lower, of the Mount Sinai Hospital. Nearly all the professors of the medical faculty of the university are among the contingent. The nurses are mostly college women, many of them from wealthy families in the West, and 90% of the orderlies are also college graduates or undergraduates from the best universities of the

Middle West, principally Ohio. Had it been authorized, a thousand such could have been enlisted at once. The unit left Cleveland on May 6, arrived at an American port the following day, still in civilian clothes, and donned their khaki uniforms as soon as they were out of the harbor. Classes were started on board, and the men were schooled for ten hours a day. The future plans of the unit cannot, of course, be fully disclosed, but it can be said that they are immediately to take entire charge of one of the large base hospitals, consisting of 1000 beds, and its present staff is to be relieved and re-distributed. It is hoped to devote special study to shell shock cases. Major Gilchrist, who gave these particulars, added that six special units from Boston and other parts of the States, with twenty-three medical men attached to each unit, would be sent, and as the United States had an abundance of medical men—1 in 699 of the population—he did not doubt that many more would be forthcoming. He had heard it stated that in all a thousand doctors would arrive within the next two months. On May 23, at Buckingham Palace, the King and Queen received the medical and nursing staff of the first American medical unit, whose official title is No. 4 Base Hospital, United States Army. Sir Alfred Keogh, G.C.B., Lieutenant-Colonel F. W. Begbie, R.A.M.C., and Miss E. H. Becher, Matron-in-Chief Q.A.I.M.N.S., were in attendance, and the American surgeons were presented to His Majesty by the United States Ambassador. The King, in a few gracious words, expressed his pleasure and satisfaction at meeting the first detachment of the American army which has reached our shores since their country resolved to take its part in the war; it was characteristic of the American nation that the first assistance rendered to the Allies should be in connection with the profession of healing. On the same day a second contingent, comprising 26 surgeons, 60 nurses, and 250 orderlies, arrived at a British port."

Correspondence.

A REMINISCENCE OF DR. HOLMES.

Mr. Editor:—

While recalling some old memoranda and anecdotes, I find some which I take the liberty of sending you as having a general as well as a personal medical interest.

Some years ago—perhaps some of your readers recollect the exact date—Mr. Reginald Harrison the well-known surgeon of Liverpool, whose genial and hospitable acquaintance many American physicians had previously made, paid a visit to Boston at the time of the meeting of the Massachusetts Medical Society. He was taken to the annual dinner and given a seat by the side of Dr. O. W. Holmes.

After the meeting he was walking down the street beside his friend, who will be recognized by the older members of the Dorchester Medical Club as the most amusing of raconteurs, and who reported his guest's experience as follows:

"Very clever fellow, that 'Olmes."

"Yes, he's so considered here."

"Written something, I think."

"Well, yes, quite a number of things."

"I must get something of his to carry home with me. Let's see, what's the title? 'Breakfast in Bed' wasn't it, or something of that sort?"

The account of American peculiarities of manner and customs as given in foreign works is apt to be amusing. The exact text of the following I have lost. I would give several copies of old text books in exchange if I could find it. It was supposed to be in illustration—or proof (?)—of the stimulating effect of a fish diet:

"At certain seasons of the year the Americans gather in large crowds upon the seashore to air their politics, theories, and to feast upon a species of oyster called the clam. When they have gorged themselves with this insidious comestible, they indulge in the wildest of delusions, fall a prey to the most worthless of demagogues and exhibit in a high degree the stimulating effect of a diet rich in phosphorus."

"The lean and cadaverous appearance of the Americans is due to the corn meal upon which they habitually feed."—Extract from an English text book on dietetics.

I am,

Very respectfully,

Springfield, Mass. ROBERT T. EDES.

APPOINTMENTS.

HARVARD UNIVERSITY.—*Dr. Roger I. Lee* has been appointed to the administrative board.

Dr. Elliott P. Joslin has been made assistant professor of medicine.

LEO M. LEVI MEMORIAL HOSPITAL.—*Dr. George L. Hoffman*, formerly assistant to Professor W. Kolle, past director of the Institut zur Erforschung der Infektionskrankheiten in Bern, has been appointed director of the newly created department of medical research at the Leo M. Levi Memorial Hospital, Hot Springs, Ark.

UNIVERSITY OF VIRGINIA.—The following appointments have been made at the University: *Dr. Theodore Hough*, acting dean, has been made dean of the medical school; *Dr. James A. Wardell* has been appointed professor of pharmacology and materia medica; and *Dr. John H. Neff*, adjunct professor of genito-urinary surgery.

MARRIAGES.

Miss Anna F. Hurley and DR. FREDERICK J. MCVEY were recently married in Dorchester, Mass. Dr. McVey is a graduate of Harvard Medical School and of the University of Vienna. He is associate professor of diseases of the ear, nose and throat at the College of Physicians and Surgeons.

RECENT DEATHS.

DR. GEORGE A. WEBBER, a veterinarian, died at his home in Brookline on June 26. Dr. Webber was born in Cambridge in 1861, the son of Dr. A. C. Webber. He was educated at Harvard and practised his profession for many years in his native city. He was a member of the Ancient and Honorable Artillery Company.

AMORY CHAPIN, M.D., a retired physician, died at his home in Boston on June 27. He was born in Providence, R. I., and received his early education at St. Paul's School at Concord, N. H. He had long been a resident of Boston, but had not practised his profession for about twenty years. He is survived by his widow.